

A treatise on the diseases of infants, founded on recent clinical observations and investigations in pathological anatomy made at the Hospice des Enfants-Trouvés : with a dissertation on the viability of the child / by C.M. Billard ; with notes by Dr. Ollivier ; translated from the third French edition, with an appendix, by James Stewart.

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Publication/Creation

London : John Churchill ; Dublin : Fannin, and Co. ; New York : George Adlard, 1839.

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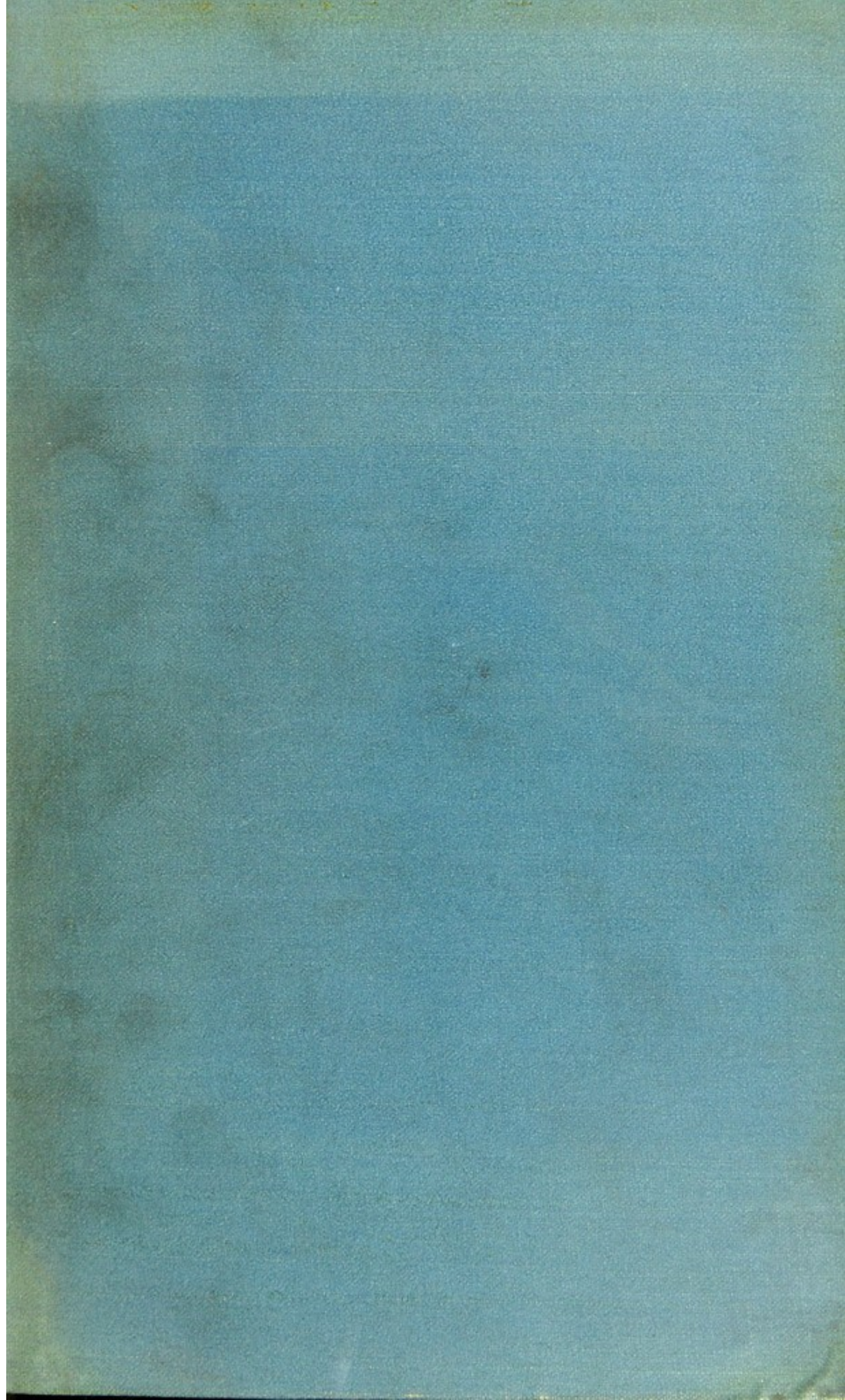
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THE HISTORY OF THE



ON
THE DISEASES OF INFANTS,
§c. §c.

PRINTED BY C. ADLARD, BARTHOLOMEW CLOSE.

A TREATISE
ON THE
DISEASES OF INFANTS,

FOUNDED ON RECENT
CLINICAL OBSERVATIONS AND INVESTIGATIONS IN
PATHOLOGICAL ANATOMY

MADE AT THE HOSPICE DES ENFANS-TROUVÉS:

WITH A
DISSERTATION ON THE VIABILITY OF THE CHILD.

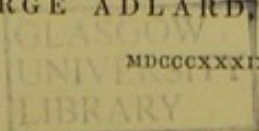
BY
C. M. BILLARD,

DOCTEUR EN MÉDECINE DE LA FACULTÉ DE PARIS, ETC. ETC.

WITH NOTES, BY DR. OLLIVIER, OF ANGERS.

TRANSLATED FROM THE THIRD FRENCH EDITION,
WITH AN APPENDIX,
BY JAMES STEWART, M.D.

LONDON:
JOHN CHURCHILL, PRINCES STREET, SOHO.
FANNIN, AND CO., DUBLIN.
GEORGE ADLARD, NEW YORK.



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4

"Vides, ut amplissima, eademque propemodum intentata pateat via ad recens natorum morbos
attenta, dum vivunt observatione, accuratâ autem post mortem dissectione pervestigandos, nisi
parentum inepta charitas obstaret."—(MORGAGNI, *de Sedibus et Causis Morborum*. Ep. 48,
p. 582, éd. Tissot.)

TO
JOHN W. FRANCIS, M. D.,
LATE
PROFESSOR OF OBSTETRICS, DISEASES OF WOMEN AND
CHILDREN, AND OF FORENSIC MEDICINE,
IN THE
COLLEGE OF PHYSICIANS AND SURGEONS
OF THE
UNIVERSITY OF THE STATE OF NEW YORK,
etc., etc., etc.,

THESE PAGES
ARE RESPECTFULLY DEDICATED,
BY HIS OBLIGED FRIEND,
THE TRANSLATOR.

JOHN W. RYAN, M.D.

PROFESSOR OF OBSTETRICS, COLLEGE OF MEDICINE AND
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AND
CHIEF, DEPT. OF GYNECOLOGIC MEDICINE

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CONTENTS.

'TRANSLATOR'S PREFACE	1	Case IV.	95
Preface to the First Edition	3	Case V.	96
Introduction	5	Erysipelas	98
PART I.			
Of the Phenomena which are present- ed on examining externally the con- dition of the Child	9	Measles	101
CHAPTER I.—Attitudes of the Child	9	Roseola	103
CHAPTER II.—Color of the Skin	12	Scarlatina	104
CHAPTER III.—Separation of the Cord	15	Urticaria	106
CHAPTER IV.—Exfoliation of the Ep- idermis	30	Blisters	108
CHAPTER V.—Size and Weight of the Child	35	Ampulla	108
CHAPTER VI.—Means of Expression of the Child	38	Pemphigus	108
The Cry considered with reference to Semeiology	38	Case VI.	109
Expression of Face	50	Rupia	111
CHAPTER VII.—State of the Pulse	54	Zona, or Zoster	112
CHAPTER VIII.—Feebleness of Birth	57	Herpes	112
PART II.			
Diseases of Infants	61	Eczema	113
CHAPTER I.—Diseases of the Skin	62	Psora	116
Section I.—Malformations and Congenital Diseases	62	Miliary Sweat	117
§ I. Absence of the Skin	63	Variola, Varicella, Varioloid	117
§ II. Cutaneous Excrescences	65	Vaccinia	120
§ III. Alterations of Color	67	Ecthyma	121
§ IV. Spo's, or Nœvi Materni	69	Acne	122
Section II.—Diseases of the Skin not Inflammatory, developed during birth or after that pe- riod	73	Mentagra	122
§ I. Ecchymoses	73	Impetigo	123
§ II. Tumors of the Scalp	74	Tinea Fovosa	124
§ III. Bruises	75	" Annularis	127
§ IV. Petechiæ	76	" Granulata	127
Case II.	76	" Mucosa	127
Section III.—Inflammations of the Skin	78	Prurigo	127
Case III.	79	Case VII.	129
Section IV.—Inflammation devel- oped after Birth	80	Strophulus	130
Table first—Classes	82	Lichen	132
Table second—Genera	84	Cancer, Lupus, Elephantiasis	133
Table third—Species	95	Leprosy	133
Erythema	95	Psoriasis	133
		Case VIII.	134
		Pityriasis	136
		Fissures	136
		Malignant Pustule, Carbuncle	137
		Gangrene of New-born Children	137
		Burns, Chilblains	138
		Diseases of the Appendages of the Skin	139
		Diseases of the Cellular Tissue	140
		Inflammation of the Cellular Tis- sue	140
		Œdema, or Induration of the Cel- lular Tissue	141
		CHAPTER II.—Diseases of the Di- gestive Apparatus	155
		Section I.—Diseases of the Mouth	156
		§ I. Malformations	162
		Case IX.	162

§ II. Passive Congestions	163	§ I. Erythematic Gastritis	250
§ III. Inflammations. Stomatitis	163	Case XXXI.	252
Erythematic Stomatitis	164	§ II. Gastritis, with altered Secre-	
Stomatitis with altered Secretion,		tion, or Muguet of the Stom-	
or Muguet	164	ach	253
Follicular Stomatitis	170	Case XXXII.	254
Ulcerous Stomatitis	179	Case XXXIII.	255
Case X.	180	Case XXXIV.	257
Case XI.	180	§ III. Follicular Gastritis	259
Pustular Stomatitis	182	§ IV. Gastritis, with disorganiza-	
Gangrenous Stomatitis	182	tion of Tissue	261
Case XII.	185	Case XXXV.	261
Case XIII.	186	Case XXXVI.	264
Case XIV.	187	Case XXXVII.	265
§ IV. Diseases of the Parts con-		Section II.—Diseases of the Intes-	
tained in the Mouth	192	tinal Canal	270
Section II.—Development and Dis-		§ I. Development of the Intestinal	
eases of first Dentition	193	Tube	270
Art. 1. Development of the Teeth	193	§ II. Malformations of the Intesti-	
Art. 2. Anomalies of Dentition	201	nal Tube	276
Art. 3. Diseases of Dentition	203	Case XXXVIII.	278
Case XV.	205	Case XXXIX.	280
Case XVI.	206	Case XL.	281
Section III.—Diseases of the Sali-		Case XLI.	286
vary Glands	210	Case XLII.	287
Section IV.—Diseases of the Gut-		Diseases of the Intestinal Tube	
tural Portion of the Digestive		developed after birth	288
Tube	211	Art. 1. Intestinal Indigestion	289
Sanguineous Congestion of the Or-		Art. 2. Invagination of the Intes-	
gans of Deglutition	212	tines	295
Inflammations	213	Art. 3. Inflammation of the Diges-	
Case XVII.	214	tive Tube	296
Case XVIII.	216	§ I. Intestinal Inflammation during	
Case XIX.	217	intra-uterine life	297
Section V.—Diseases of the Œso-		§ II. Intestinal Inflammation devel-	
phagus	219	oped after birth	299
Case XX.	223	Case XLIII.	297
Case XXI.	224	Case XLIV.	298
Diseases of the Œsophagus devel-		Enteritis	300
oped after birth	225	Case XLV.	301
Case XXII.	226	Case XLVI.	304
Case XXIII.	226	Follicular Enteritis	305
Case XXIV.	227	Case XLVII.	307
Case XXV.	229	Case XLVIII.	309
Case XXVI.	230	Case XLIX.	310
Case XXVII.	231	Enteritis with disorganization of	
Diseases of the Sub-diaphragmatic		Tissue	312
Portion of the Digestive Tube	236	Case L.	313
Section I.—Diseases of the Stom-		Art. 4. Spasm of the Intestines	320
ach developed during intra-		Art. 5. White Softening of the	
uterine life	237	Gastro-intestinal Mucous	
Case XXVIII.	239	Membrane	323
Case XXIX.	240	Case LI.	323
Diseases of the Stomach developed		Case LII.	325
after birth	242	Art. 6. Inquiry into the principal	
Art. 1. Gastric Indigestion	243	Diseases of the Intestinal Can-	
Art. 2. Lesions of the Stomach,		nal	327
with or without disturbance of		CHAPTER III.—Diseases of the Ap-	
its functions	247	pendages to the Intestinal Can-	
§ I. Congestions of the Stomach	247	nal	332
Case XXX.	248	Section I.—Development and Mal-	
§ II. Inflammations of the Stomach	250	formations of the Liver	332
Gastritis	250	Section II.—Diseases of the Liver	333

CHAPTER IV.—Diseases of the Urinary Apparatus	342	the Fœtal Openings	440
Art. 1. Development	342	Art. 2. § I. Diseases of the Heart and Large Vessels	444
Case LIII.	344	Case LXXVII.	447
Case LIV.	345	Case LXXVIII.	448
CHAPTER V.—Peritonitis	352	§ II. Pericarditis	450
Case LV.	353	CHAPTER X.—Diseases of the Cerebro-spinal Apparatus	452
Case LVI.	354	Case LXXIX.	462
CHAPTER VI.—Ascites	357	Case LXXX.	471
CHAPTER VII.—Abdominal Hernias	358	Art. 2. Diseases of the Cerebro-spinal Apparatus developed after birth	472
Umbilical Hernia	359	§ I. Congestions	472
Congenital Inguinal Hernia	360	§ II. Softening	474
Case LVII.	361	Case LXXXI.	474
Prolapsus of the Rectum	365	Art. 3. Inflammation of the Cerebro-spinal Apparatus	476
CHAPTER VIII.—Diseases of the Respiratory Apparatus	366	§ I. Spinal Meningitis	477
Section I.—Diseases of the Nose and Nasal Fossæ	366	Case LXXXII.	477
Case LVIII.	371	§ II. Cerebral Meningitis	478
Case LIX.	380	Case LXXXIII.	481
Section II.—Diseases of the Larynx and Trachea	375	§ III. Inflammation of the Spinal Marrow and Brain	484
Case LX.	380	Case LXXXIV.	488
Inflammation with altered Secretion or Croup	382	CHAPTER XI.—Diseases of the Organs of Locomotion	490
Œdematous Affection of the Throat	389	Case LXXXV.	493
Case LXI.	389	CHAPTER XII.—Diseases of the Organs of Generation	496
Section III.—Diseases of the Thoracic Portion of the Respiratory Apparatus	392	CHAPTER XIII. Diseases of the Lymphatic System	499
Case LXII.	395	CHAPTER XIV.—Diseases of the Eyes	500
§ I. Diseases of the Pleura, Lungs, and Bronchiæ, before birth	396	Art. 1. Development and Malformations	500
Case LXIII.	397	Art. 2. Ophthalmia of Infants	502
Case LXIV.	398	CHAPTER XV.—Jaundice of New-born Infants	506
§ II. Diseases of the Lungs and Pleura developed during or after birth	399	CHAPTER XVI.—Accidental Tissues in New-born Infants	509
Case LXV.	400	Case LXXXVI.	509
Art. 1. Congestions and Pulmonary Apoplexy	402	CHAPTER XVII.—Alteration of Blood	512
Case LXVI.	404		
Case LXVII.	404		
Art. 2. Pneumonia	406		
Case LXVIII.	407		
Case LXIX.	408		
Case LXX.	409		
Case LXXI.	411		
Case LXXII.	412		
Art. 3. Bronchitis	416		
Case LXXIII.	416		
Art. 4. Pleurisy	419		
Case LXXIV.	419		
Case LXXV.	420		
Art. 6. Hoopingcough	424		
CHAPTER IX.—Diseases of the Circulatory Apparatus	433		
Case LXXVI.	434		
Art. 1. Establishment of Independent Circulation	437		
§ I. Period of the Obliteration of the Fœtal Openings	437		
§ II. Mode of the Obliteration of			

MEDICO-LEGAL DISSERTATION ON VIABILITY, with reference to the Pathology of New-born Children 515

PART I.

Malformation and Congenital Diseases	516
§ I. Malformation and Diseases of the Skin	516
§ II. Digestive Apparatus	518
§ III. Urinary Apparatus	523
§ IV. Peritonitis	524
§ V. Abdominal Hernias	525
§ VI. Respiratory Apparatus	525
§ VII. Circulatory Apparatus	530

§ VIII. Cerebro-spinal Apparatus	532	Size and Weight of New-born Children	548
Case	535	Monstrosity	550
Case	537	Congenital Smallpox	551
PART II.		Erysipelas	551
Medico-legal Inductions	540	Measles	553
Table of Congenital Diseases	542	Scarlet Fever	555
Order I.—Malformations and Diseases necessarily mortal	542	Acarus Scabei, or Itch Insect	568
Order II.—Diseases which, without being necessarily mortal, may oppose the development of Independent Life	543	Vaccinia	568
Order III.—Diseases not affecting Viability	544	Aphthæ	569
		Gangrene of the Mouth	570
		Edentula	570
		Teething	571
		Bloodletting	572
		Occlusion of the Rectum	577
		Colic	578
		Functional Disorders of the Liver	579
		Hepatic Affections—Bilious Diarrhœa—Cholera Infantum	580
		Cholera Infantum	587
		Suspension and Retention of Urine	593
		Croup	594
APPENDIX	547	Whoopingcough	599
Separation of the Cord	547	Meningitis—Hydrocephalus	600
Hæmorrhage from the Cord	547	Viability	601

TRANSLATOR'S PREFACE.

THE progress which has been made in medical science by the labors of those who have devoted themselves to the investigations of the various parts of the human body in disease, will distinguish the present age, above all others that have preceded it, as a period of accurate observation, and of great utility in medicine. Anatomy, formerly cultivated only as preliminary to the study of surgery, has of late been made to subserve the interests of practical medicine; and it is obvious that a knowledge of the various structures and functions in a healthy state, and the alterations they undergo in disease, must be of great importance in assisting the practitioner in the exercise of a proper discrimination in any departure from health, and that it is from anatomical and pathological science alone that a conception of the changes which occur in the various tissues from altered action can be obtained. The substantial truths thus accumulated, united as they should always be with a close observation of symptoms, constitute the amount of our knowledge of morbid affections.

The pursuit of these objects needs an interest in science, a self-devotion and zeal, of no ordinary character. To study the intricate parts of the wonderful structure of man,—to investigate their peculiar relation to each other, and their adaptation to the purposes for which they were formed, is an occupation of pleasure, as well as a source of instruction; but to extend the investigation of minute anatomy in tracing the insidious progress of disease through each tissue,—to devote months and even years to the toil arising from the necessary multiplication of objects of research, must be attended with much personal privation, and demands an ardent love for science, commensurate only with the importance and magnitude of the objects sought.

Among the many, in every country where science is cultivated, who have been thus engaged in serving the interests of humanity in the improvement of the healing art, there are none who have enjoyed better opportunities of pursuing these studies than the French pathological anatomists; and it must be conceded that none could have surpassed them in diligence. From the time that Bichat first applied himself to his researches in the minute anatomy of diseased parts, investigations in pathology have been pursued with a zeal unsurpassed at any former period, and to the labors of the French pathologists are the medical world indebted for the possession of many important and interesting facts illustrative of the progress and effects of diseased action.

In this class of contributors to science is the author of the following pages, and their perusal will show that he has not been less persevering in his researches than his predecessors. The field chosen by him is new, not having heretofore received the attention of any who have occupied themselves in the investigations of pathological truths. While the fact that each texture possesses, equally with its particular species of vitality, its own peculiar diseased action, has been proved by others, he has shown that the period of life exercises also an important influence in the development of morbid affection. The application of these discoveries must undoubtedly be of great practical benefit to medicine.

In addition to pathology, another object of the author is to add something to the stock of legal medicine. Too implicit a reliance in a legal question on any one appearance of the body of a child, however unerring the inferences may have sometimes been, will often lead to error, from circumstances arising that lessen the value of the appearances which various parts exhibit. The discovery, therefore, of new facts, and by their assemblage and joint concurrence to remove all causes of fallacy, is a desideratum with all medical jurists, and is only to be attained by diligent, close, and continually-extended observation; and it is the mutual relation thus ascertained which alone will arrest the fluctuating opinions of medical witnesses, and give some degree of certainty to medical evidence. In this department, the author has detailed a number of interesting facts, with admirable discrimination and a happy clearness of illustration. For the additional remarks on this subject, the translator is indebted to **Dr. JOHN W. FRANCIS**, late Professor of Forensic Medicine, who, with his characteristic kindness, cheerfully complied with the request for permission to record in the appendix his experience and opinions on a matter of so interesting a nature.

The great number of cases which the author has submitted to examination,—his careful discrimination of the various appearances on dissection,—his separation of complicated cases from those in which the disease under consideration appeared unmixed, that the detail of symptoms might be a clear indication of the anatomical changes,—make this work a valuable pathological record for the practitioner; while from the many novel facts it contains connected with the subject of infanticide, it will be found to be equally valuable as an addition to the library of the student of medical jurisprudence.

NEW-YORK, September, 1839.

PREFACE TO THE FIRST EDITION.

ONE day in reading Morgagni, a favorite author of mine, I was particularly struck with a passage in the latter part of his forty-eighth epistle. This distinguished observer, after having enumerated the affections to which new-born children are liable, complains of the little progress that has been made in their pathology, and laments with much feeling that mothers, from a false tenderness, constantly oppose the examination of the bodies of their children, the symptoms of whose diseases may have been watched with great carefulness and attention. "How vast and new," says he, "is the space that is still open before us for the study of the diseases of young children!"

From Morgagni's day to the present time, the subject has received the attention of men much more capable than myself, of extending the boundaries of science, and when I engage after them in the same course, I do not pretend to accomplish more, or to go further, but only to glean the facts which have escaped their notice, and to unite with their discoveries some more recently-ascertained truths, persuaded that in thus bringing together the facts scattered throughout the various departments of science, I shall be able to render some service to humanity.

Occupying for a year an important station in the Hospice des Enfants Trouvés, in Paris, I observed with close attention the children in that institution, and upon the occurrence of a fatal termination of their diseases, I availed myself of the opportunity thus afforded to examine by dissection all their organs, and ascertain the causes and seat of each disease. In this manner has the wish of Morgagni been fulfilled. I have been able by these means to compare the symptoms observed during life with the anatomical lesions by which they have been produced.

The principal object of this work is to exhibit the peculiar character of infantile diseases, and to consider them in relation to the

alterations which the organs have undergone. Each system has passed successively in review, and I have studied the varieties of form and appearance of every organ, with reference to its healthy, abnormal, and pathological condition, and it was not until the value of the symptoms was estimated, and the nature of the anatomical lesions duly considered, that I finally ventured to suggest the method of treatment.

I have considered as briefly as possible the development of the organs, and without deeming it advisable to devote much attention to congenital malformations, I have particularly noted those which have been productive of some symptom during life, and which have thereby disturbed the various functions of the child.

I have neither treated of fevers, intestinal worms, nor the diseases of the lymphatic system in particular, because they are of rare occurrence in new-born and sucking infants,—to which class of children I have confined my attention,—but belong more especially to the period of second infancy or to the second epoch of first infancy. The absence of all febrile reaction in young infants, when at the same time there exist serious lesions, and the readiness on the contrary with which fever is excited by the slightest cause in those who are teething, impress on these two periods an important difference in the character of their diseases.

The subjects considered in this work being of considerable extent, I have used as much conciseness as possible in the history of each disease, and all discussions not susceptible of elucidation by facts have been avoided, and speculative theories altogether rejected.

Finally, I have written this work with the independence of one who would not draw from existing doctrines any thing, however positive, the truth of which could not be proved by established facts, or by natural analogy. In this I have but imitated the great number of those who have cultivated science at the present day. This essay, then, carries with it the impress of the age and the spirit of contemporaneous philosophy.

PARIS, April, 1828.

INTRODUCTION.

WHEN any branch of the science of organization is to be studied, the grand principles that appear to direct the operations of nature, and which the labors of learned men of the present day have enabled us in some degree to understand, ought in the first place to be diligently sought. These principles, the true fundamentals of science, should serve as a base—as a point of departure—and around them it is our duty to gather the results of our labors and discoveries; for it is such an assemblage that constitutes the philosophy of science, and without which the thoughts advance, destitute of a guide or an object, in the midst of the theories and hypotheses that fill the history of the researches of the human mind. Thus, analysis and synthesis have led us to regard as well established the following truths relating to the task we have undertaken:

A. From the moment that two or more substances are united in such a manner as to form a body, for the preservation of which the general laws of nature exercise their control, this body enjoys properties and exhibits phenomena which are peculiar to it, and which depend on its structure and organization. In the mineral or inorganic kingdom, crystals and salts exist, the result of affinity, and of the attraction of aggregation between a determinate number of different atoms; and these binary or ternary compounds, with physical and chemical properties, are so peculiar to the composition of the body to which they belong, that these qualities will necessarily be modified, if any change is produced in the intimate composition of the body.

B. The same occurs in the organic kingdom: the structure of vegetables embraces also the condition of their qualities, and the changes in the nutrition, composition, and ultimately in the taste of the fruit produced by the soil and climate, are very remarkable modifications; so true is it that their qualities and properties are immediately dependant on the structure and organization.

C. What we have said with respect to vegetables is also applicable

to the animal kingdom. It is well known that the form, functions, and peculiar constitution of animals depend on their organization, and the varieties presented by the infusoria, the molusca, the vertebrata, and mammalia, are well known. If this proposition is true with regard to the different classes of organic bodies, it is also true with regard to the different individuals of the same class, or the same species, considered in the various changes occurring in their development. Thus the human ovum some days after conception differs greatly from the fœtus, the full-born infant, and the adult; by reason of the actual condition in which the materials entering into its composition reciprocally exist. The labors of anatomists go entirely to the support of this proposition, which is nothing more than a result of the general principles previously exposed; and we ought not to regard it as a preconceived principle, but as a general rule established at this time from the knowledge of truth.

D. We find ourselves now ready to establish *a priori* another principle that will be abundantly confirmed in the following pages, but which it is important at this time to advance, that the spirit in which this work is composed may be known. It is, that if all the functions of living, organized bodies, or rather, if the manner in which these functions are performed, be found in dependance on the organization, the alteration of the functions, or the diseases resulting from any disturbance in the organs, vary equally, according to the different subjects affected, and according to the different epochs in the life of the same subject.

Thus, in proportion as the ovum, the embryo, the fœtus, and the adult, become more perfect in their organization, their functions undergo a peculiar change in a state of health, and likewise present corresponding peculiarities of symptoms in disease, the forms of which will change according to these different phases of organization. The embryo, being but a simple mass of cellular tissue and mucus, dries like a leaf from a tree, when any accidental cause detaches it from the body from which it derived its support. Furnished at a later period with an external covering and an internal canal, provided also with circulatory vessels and organs, and finally changed into a sensible and moveable body; a new organization, new functions, and new symptoms of disease inevitably present themselves; for the organization, functions, and diseases are necessarily connected with each other, forming a succession of links, the whole of which constitutes life, considered in its origin and development, and also in its normal and abnormal state.

E. From these considerations, then, it appears that it is not after birth only, as has been asserted by philosophers, that man for the first time experiences that series of maladies which afflict his race, but that the origin must be sought in a much more remote source; it commences with the organization; and the annals of science present at this day a number of facts, which attest that during intra-uterine life man often suffers many affections, the fatal consequences of which are brought with him into the world. We can here advance another proposition which, already established by facts that are daily enriching science, will receive confirmation by the observations found in this work; it is, that *children may be born healthy, sick, convalescent, or entirely recovered from former diseases.* This truth is of great practical importance, for if after birth children are affected with diseases, the progress of which is not interrupted at the period of birth, but on the contrary the diseases continue to run their course, it may easily be conceived how important it is for the physician to be able to recognize the external signs they present, in order to arrest their progress, if it can be done. On the other hand, if it happen that a child is born convalescent from a disease that had existed during the intra-uterine life, it is evident again that great care will be necessary in such cases to protect and foster the wavering health of one in so debilitated a condition. And if the child be born after the disappearance of disease, the physician has still a task to perform; he ought under such circumstances to instruct the parents in the best method of restoring vigor to the exhausted constitution; the influence of a proper regimen will be all that will be necessary to enable the child to recover the energies of health.

This hasty exposition of a few of the general principles established in science by the labors of those who have devoted themselves to the cause of truth, will give us some idea of the method we propose to adopt in the study of the diseases of sucking children: and we will endeavor to understand their peculiar character, the better to enable us to facilitate their diagnosis, a subject both difficult and obscure; at the same time, we will also attempt to point out with care such affections as differ from those of more advanced age, or bear an analogy to them.

Before entering upon the study of particular diseases, it will be necessary to consider the general phenomena which are presented upon examining the external condition of the child; this will be the subject of the first part of this work. The second part will comprise the history of diseases developed both during intra-uterine

life and after the period of birth. I shall study these diseases according to the systems, and will commence always with an examination of the development in each organ, the alteration which it undergoes during the various periods of its formation, and with the appearances it presents in a state of health.

A
TREATISE
ON
THE DISEASES OF INFANTS.

PART I.

OF THE PHENOMENA WHICH ARE PRESENTED UPON EXAMIN-
ING EXTERNALLY THE CONDITION OF THE CHILD.

BEFORE commencing the examination of the particular diseases of the organs, it may be useful to enter upon the consideration of such subjects as present themselves to the observer in reference to the external condition of newly born and nursing infants, the period of life to which we propose to limit our researches. A precise knowledge of the phenomena which are exhibited upon the examination of the child, and which it is necessary to consider in all diseases, such as the expression of face, crying, circulation, etc., is indispensable: for if we are familiar with these in a state of health, it will be much more easy for us to appreciate the modifications they undergo in disease. On this account they become important marks of comparison.

CHAPTER I.

OF THE ATTITUDES OF THE CHILD.

IF the child, immediately after birth, and while the accoucheur is engaged in tying the umbilical cord, be allowed to remain in the situation in which it was expelled from the uterus, it will

be observed that a flexion of its members takes place, the head and the breast approximate, the body rolls upon itself, and assumes a posture somewhat similar to that it had while within the womb. When the child is separated, it attempts to stretch the limbs, and will toss them about with considerable force; but the action of the flexors always prevails over that of the extensors; the limbs therefore bend, the hands contract, and the trunk tends to curve forward; the head will not as yet obey the muscles appointed to preserve it in its erect position, and it moves from side to side, but more particularly forward. In a word, the flexed position of the limbs and the forward curvature of the trunk, constitute the peculiar position of a newly born infant.

It is very difficult to indicate precisely, the different periods at which an infant assumes new attitudes; these vary according to the muscular strength or weakness of each. I believe also that the muscular contractions which determine the attitudes of an infant, being under the influence of the will, become evidences of the activity of the sensorial power, and that the brain has commenced the exercise of the powers to which it is destined. All these movements are at first purely automatic in their character. From the first day it will be observed to grasp at every thing around, and sometimes seizing them mechanically will even carry them to its mouth. Several children recently born, being placed together on a bed, I observed one of them take the hand of another, and completely filling the mouth, sucked it greedily; a movement which could scarcely be attributed to the exercise of voluntary power.

But in proportion as the child advances in years, it exercises the arms and hands by reaching toward the objects which are within its grasp; it soon avoids such as are not agreeable, and is attracted by those which afford pleasure, and they are thus made instruments of repulsion and attraction according to its desires or wants. The motions of the superior extremities at first purely automatic, soon become voluntary; we often see very young infants seize with eagerness a finger or a coral presented to their notice. Almost all will place the hand in that of the nurse; or, introducing one or more fingers into the mouth, occupy themselves with sucking.

To the voluntary motions of the arms succeed those of the

head; from being at first tottering, it becomes fixed upon the neck. In proportion as the faculty of vision is improved, the motions of the head become of a more decided character. At the age of a month the infant will already turn its head on the pillow, either to the right hand or to the left, when a brilliant object is brought alternately on the one side or the other. At the age of six weeks, he fixes his attention on surrounding objects, and is attracted particularly by a strong light: hence the well known recommendation to prevent a ray of light from falling obliquely upon the head of an infant in the cradle, under the apprehension that the axis of vision might thereby be made to deviate from the natural direction.

At six weeks or two months, the infant scarcely begins to have power to support its head, but is constantly to be seen moving it about in a very irregular manner, it appears too heavy for the muscles of the neck to direct its movement. It is far from being useless to consider these matters, for they serve to determine the time when the infant may be carried in the arms without the danger of suffering from fatigue. We are of opinion that the infant ought to be kept in a horizontal position, or carried on a pillow, when it is perceived that it has not as yet sufficient muscular strength to maintain the head in an erect position; in about two months, it will begin to have power sufficient for that purpose. To this rule, however, there are many exceptions, attributable to the strength or weakness of different individuals.

The vertebral column becoming more and more solid, the trunk sustains itself better, and at the age of four or five months, we see the infant support itself in sitting. The base of support in this position is between the hips, the spreading of which is constantly becoming more apparent. Nothing at this time interferes to prevent the infant from being carried about in the arms. The widening of the hips increasing, the sitting posture is thus rendered more easy; and at the age of seven or eight months, infants will sit up in their cradles, and move from right to left, or forwards and backwards, with the greatest facility. We may, therefore, at this period place them in this posture, and allow them freely such exercise as they are capable of using.

The strength and movements of the leg are developed last of all; and about the eighth or ninth month, the infant essays

to sustain itself upon the legs, and attempts to walk. There are many, however, who do not walk at the age of a year.

From the preceding observations, it appears that the flexed position of the members, and the forward curvature of the trunk, are the natural attitudes of a new-born infant; that the voluntary movements are primarily developed in the superior extremities; the hand, which at first acts only mechanically, becomes more and more suited to its uses, under the direction of the will.

The motions of the head, neck, trunk, and lastly of the inferior extremities, follow each other in their developments; so that the infant gradually emerges from its inert condition, in which indeed it possessed in an imperfect state all its motive organs. Man is not designed by nature to creep on all-fours, as has been maintained by some philosophers; but he acquires insensibly the power to assume the attitudes, and to exercise all the motions which characterize the individuals of his species, in proportion as his body becomes more perfect, and the muscular power more developed. If he grasps at things even from the period of his birth, it is because the clavicle, humerus, and bones of the fore-arm are then sufficiently formed for that purpose; while the pelvis, on the contrary, being quite narrow, and almost entirely cartilaginous, affords to the lower extremities no point of support of sufficient solidity, nor to the trunk a base large enough to allow of standing, much less of walking. Thus we find all the functions of the system becoming developed, perfected or altered, in connexion with the organization upon which they depend.

CHAPTER II.

OF THE COLOR OF THE SKIN.

THE color of the skin equally deserves our attention. Infants recently born, are almost always of the same color. Blood predominates in their tissues, and communicates, to them its hue

and the face, body, and limbs are all strongly colored. From the fifth to the eighth day after birth, this hue diminishes, but will in some cases continue a longer time; it is therefore difficult to indicate precisely its probable duration. This red color is purely accidental, and upon its disappearance, is followed by other hues of various character.

If it continue, it is not so intense as at first; it becomes of a violet hue, and the hands and feet more particularly exhibit this change of color. The alteration, however, is not always an evidence of health, for it often co-exists with an œdematous swelling of the limbs. We will return hereafter to the consideration of this violet coloring, and to the subject of the congestion of the integuments of new-born children. To this primitive sanguineous color, several peculiar hues succeed. The integuments become of a beautiful rose, of a remarkably white, or of a yellow, more or less deep.

When the finger is applied to the skin of an infant, the red color disappears at this point, and it becomes yellowish; afterwards the blood returns by degrees in the capillaries from which the pressure had removed it, and the yellow tint is replaced by the previous red. It will often be observed, after the red color has disappeared, and before it becomes altogether white, that the skin will exhibit a universal tint of yellow, and sometimes of a copper color. This is thought, by physicians generally, to indicate an affection of the liver. The result of our observations on this subject, however, will justify us in controverting this opinion.

We can easily conceive how the blood, being distributed by the organs to the surface, for the nourishment of the integuments during the first period of extra uterine existence, imparts to the surface a rosy and vermilion hue, while at the same time they are distended by firm and elastic flesh. This is an evidence of health; and it is remarked by the least observing, that the infant is in sound health when it possesses a rosy and soft skin, and muscles firm and elastic to the touch. This opinion is just, although there are exceptions. The skin of a new-born child is covered with an albuminous paste, more or less thick; and a viscous humidity remains upon it for some days, particularly in the folds, often causing considerable irri-

tation. The skin soon becomes dry, but its exhalation exhibits nothing remarkable.

This red color has at all times attracted the attention of physicians. Van Swieten, in his Commentaries on the Aphorisms of Boerhaave, says, "*Hæc cutis rubedo æquè manifesta est in Ætiopæ ac in Europæo et vulgo creditur eò nitidiorem ac pulchriorem cutem futuram postea, quò magis rubicunda fuerit in recens nato infante.*"

It has been believed that the general redness appears only in such as have been washed in warm water, in order to remove the sebaceous matter with which the child is usually covered; but I have observed infants exhibit this color even before they were washed; whence I conclude that it is more reasonable to attribute it to the superabundance of blood in the integuments. I cannot believe in the assertion that infants, who are the most red at the birth, will afterwards become in proportion whiter. I have never observed any thing to give confirmation to this rule. The peculiar hues which the skin afterwards assumes, are sometimes influenced by light or temperature, as well as by the place of residence. Children brought up in large cities, are always paler than those living in the country, who are constantly exposed to the rays of the sun. Besides the influence of temperature and of climate, peculiar to certain countries, various colors exist, which are the effect of a peculiarity of constitution. About the end of the third month, the distinctive color becomes established, and we can from that time distinguish dark-complexioned children from those that are fair; at a much more tender age the hair has already assumed its proper hue; but it is not until the period of which we are speaking, that the skin on the body becomes dark or light colored, the face either pale or ruddy, and the traits peculiar to each constitution delineated. It is true that a great number of external causes produce modifications in the constitution and temperaments of children; I only observe, that it is at the age of two or three months that we can begin to discover the shades of color, and the prevailing hue of each infant. As the child advances in age these differences become more evident.

CHAPTER III.

OF THE SEPARATION OF THE UMBILICAL CORD.

I PROPOSE now to consider all the phenomena which precede, accompany, and follow, the separation of the umbilical cord. Notwithstanding the interesting accounts on this subject contained in the numerous treatises on midwifery, and legal medicine, it appears to me that there still exists a want of information in reference to it ; a deficiency which I propose to supply by detailing the results of my observations.

§ I. *Of the desiccation of the umbilical cord.*—The desiccation of the umbilical cord, and the time of its separation from the abdomen, differ very considerably in different individuals, inso-much that it is extremely difficult to establish in relation to it any fixed rules. In order to be familiar with these varieties, I shall examine particularly the subject of this chapter, and compare the inferences made, with the statements of those authors who have preceded me.

My observations have been directed to eighty-six children of different ages and sexes, all apparently in good health : and in the first place I examined particularly the two well-marked differences between the cords which have been pointed out by accoucheurs. Some umbilical cords are large, soft, and thick ; these contain, according to Wharton, a great deal of gelatine ; others are small and thin, and contain very little albuminous matter. The former require a larger time to dry away ; they have a tendency to soften, and often separate at the base. The latter soon become dry and transparent like parchment, they desiccate very rapidly, and upon becoming quite dry, black lines, the remains of the blood-vessels, may be observed in their tissue. About one-third of the whole number are of slender kind, the remainder are of those abounding in gelatinous matter. Before desiccation they shrink, which is the beginning of this process. The following shows the results of my observations in relation to the time at which the desiccation commences.

Of eighty-six infants who came under my notice, the cords of sixteen were a little shrunk, but were at the same time quite fresh. They were soft, bluish, and very flexible, and completely filled the ligature; the cut surface was quite smooth. Of these sixteen, one was of the age of five hours, six of one day, four of two days, and four of three days. These cases afforded an opportunity of observing the shrinking of the cord from the first, to the third day after birth. But it does not always follow from this, that the desiccation, which always succeeds the shrinking, never commences until after the third day. It often begins much sooner, as we shall see by the details which follow. Among the eighty-six infants whose cases we are now considering, there were twenty-four where the desiccation had either commenced at the summit, arrived at the middle, or had already spread near the base of the umbilical cord. Seven were but of the age of one day, eleven of two days, three of three days, and three of four days. Among some, the cord was large and very soft, with a thick, projecting cutaneous ring at the base. In neither of them did the extremity exhibit a smooth surface, but it had begun to blacken and shrivel, while the ligature was quite loose; in the greater number of cases there had been no inflammation at the umbilicus. By this it will be seen that the desiccation generally begins on the first or second day; it has sometimes, however, been as late as the fourth day.

The period of the complete desiccation of the cord is not less variable. Among the eighty-six infants to whom reference has been made above, there were twenty-five where the cord was perfectly dry; of these, five were of the age of two days, nine of three days, five of five days, four of four days, one of one day, and one of one day and a half. The third day, therefore, appears to be the usual time at which the desiccation of the umbilical cord is completed, although it has not occurred in some cases until the fourth or fifth day; and, as we have seen, been even as early as the first day. But it ought to be known that the cords in the last mentioned cases were extremely thin, and it was owing to this peculiarity that the desiccation was hastened.

Immediately upon cutting the cord the vessels retract and disappear in the gelatine, which constitutes so large a part of the cord, and which gives to it its form and thickness. This gelatine

begins to dry away even while the exterior membrane retains its suppleness. It is not always at the summit that the desiccation commences, for it often exhibits the beginning of this process at the place where the ligature remains for some time soft. The cord shrinks and shortens; at the same time, a general constriction takes place from the circumference to the centre, whereby the vessels become compressed, flattened, and tortuous, and at last partake themselves of the desiccation. They are solidly compressed in the thick dried lymph, resisting any further retraction, and exhibit small black opaque filaments, winding in the middle of a semi-transparent substance. At this period the ligature is altogether useless, and hemorrhage from the extremity of the cord need not be apprehended.

The desiccation progressing by degrees towards the navel, stops at last at the cutaneous ring at the root of the cord, from which the dried portion soon becomes separated, either by a proper suppuration, or by a spontaneous detachment analogous to that by which the stem of a cucurbitaceous fruit is separated. The dried gelatine, and not the epidermis, as has been asserted, forms around the three-fold vascular bundle, a kind of knot which compresses and defends the walls of these vessels. There exists always between this point of constriction and the place where these three umbilical vessels pass to their destination, a space or neck more or less short, where the cord consists of nothing but a little vascular bundle, the last connexion of the abdomen with the cord, moving in every direction as on a slender pivot. This vascular line is entirely surrounded by the cutaneous ring of the umbilicus, upon the circumference of which the separation of the cord has left small excoriations; it does not, as has been asserted by Gardien, produce any constriction upon the umbilical vessels. The skin of the umbilicus gathers in large folds when the base of the cord is dried, but it is by the drawing of the hardened gelatine, and when the separation is effected around the whole circumferences, that the skin of the umbilicus becomes thus folded upon itself. This condition of the skin, therefore, is the result, and not the cause of the desiccation. It is at this point, that is to say, at the point where the gelatine ceased to exist, that the cord separates, and all the concurrent circumstances then favor the event; indeed, even the crying of the child, pro-

ducing every moment an elevation and depression of the diaphragm and liver, and causing the alternate movements of expansion and retraction of the parietes of the abdomen, materially assist it; the effect produced, being a continual drawing of the umbilical vessels towards the interior of the cavity of the abdomen, while on the other hand the external dried portion of the cord, being drawn by the clothes of the child or fixed by its appropriate bandage, resists with considerable force the internal movements; the cord, yielding at its slender part to this constant drawing, separates and falls. Thus the desiccation is the predisposing, and the pulling of the cord the immediate cause of its separation. In this way we can explain how it happens that the cord is always ruptured at the same place, and why we never see it detach itself at the abdomen before the complete desiccation of the gelatinous matter. The desiccation of the cord is altogether a physiological phenomenon, belonging to the assemblage of vital phenomena, and entirely dependent on them. That part of the cord attached to the placenta does not exhibit the phenomenon of desiccation, like the portion remaining with the child, but shrinks and decays like a dead substance, whilst the abdominal portion is not so affected. Here the desiccation ceases as soon as life is extinct; it either does not proceed in still-born children, or it is considerably retarded. In place of drying and separating at the end of a few days, as is observed during life, the cord undergoes in the dead body a perfect decomposition, differing entirely from its normal desiccation. We often see a fœtus brought into the theatre for dissection, and remain there some days without the cord becoming dry; it will even continue soft, and the vessels sufficiently open to allow of being injected; while during life it dries, and the vessels are obliterated on the first, second, and third days; and I have never seen the cords dry away at first, but remaining soft and flexible until the fourth or fifth day, when they often separate in a state of putrescence. I have been able to inject the body of a still-born child from the umbilical cord at the end of four days, only taking the precaution to moisten the extremity, which had become a little dry. The cord did not exhibit the least degree of desiccation, but was only very tender. The normal desiccation of the umbilical cord may therefore be regarded as a physiological phe-

nomenon, occurring only during life, and ceasing with the suspension of vitality.

The following cases are in support of this assertion :—Three living but feeble children, born at one birth on the night of the 20th of October, were brought a few hours after to the Hospice des Enfants Trouvés. One of them died six hours after birth ; the cord of this child was very soft, and not in the least shrunk. Another died on the night of the 22d ; the cord of this one was flattened, twisted, and dried about half its length. The third died on the morning of the 23d ; the cord of this child was dry nearly the whole length. In neither of these cases was there red circles around the umbilicus. The first mentioned child was carefully preserved in an envelope ; and on the 24th the cord had not yet showed any signs of desiccation, but was only a little shrunk. The desiccation of the cord was not at all effected in this case, death having entirely prevented its occurrence, whilst in the two that survived, the phenomenon was observed to commence and to run its course until arrested by death.

Without attempting to explain how this phenomenon, which appears to be altogether physical, is so intimately connected with life, I will merely remark, that the animal heat, which, during the life of the child, is communicated to the cord, favors very materially the evaporation and drying of the gelatine of Wharton, and that the moisture which exhales from the dead body, keeps the gelatine soft, or hastens its decomposition ; whether this be the case or not, the fact exists, and it appears to me proper to keep it in remembrance, from its important application to legal medicine. For if a fœtus be examined some time after birth, or when the body has been disinterred, if the cord still remain attached, we ought to observe closely if it exhibits the peculiar characteristic of a normal desiccation ; that is to say, whether it is red, flattened, and twisted, and the vessels obliterated ; or whether it is soft or in a state of putrefaction, analogous to the general condition of the dead body ; for in the former case, the child could not have been still-born, but might have lived one or two days, since the desiccation, which only exists during life, had already commenced, while in the latter, the infant was still-born, or had lived but a short time ; the umbilical cord flabby or slightly shrunk, having not yet experienced the proper desicca-

tion. In short, such is the importance of the fact, that I would particularly call the attention of physicians to its consideration, that it may, in conjunction with other circumstances, concur in demonstrating whether the child was born alive; as the principle can be laid down that in every instance in which the cord is dried, flattened, twisted, and blackened upon the dead body of an infant, it has lived at least one day, this condition never being produced on a dead body. To recapitulate; the conclusions applicable to legal medicine upon examining the umbilical cord before its separation, are: 1st. The desiccation of the umbilical cord cannot take place except during life. 2d. At the period of death, the desiccation is suspended, or considerably retarded. 3d. If the cord be fresh, or the shrinking but just commenced, the infant may have been still-born, or have lived but a very short time. 4th. If the cord has already exhibited the beginning of desiccation, or is completely dry, the infant has lived at least one day. The more recent the death of the fœtus, the greater is the dependence upon these conclusions.

When the cord is left to putrefy upon the dead body, it first assumes a greenish white color; it then becomes corrugated at the extremity, and shrinks. The pellicle of the cord is easily detached, but the cord will not separate from the abdomen at its point of insertion, as is observed to be the case during life; it may easily be torn in all places, and lessens and withers its whole length, and if the child has been immersed a long time in water, it remains flabby and tender; the same thing occurs when the child is dead, and has remained some time in the waters of the amnios. In the opposite case, it exhibits much more resistance, and less softness, and the umbilical vessels which perform the office, as we may say, of a root, will constantly oppose a considerable degree of resistance to the force which may be used to break it. I have never seen the cord of a still-born child become dry before the fifth or sixth day, and have also observed, that it preserves its circular form and suppleness for some days. Dr. Ollivier, of Angers, has favored me with a very interesting communication on this subject. He was called on the 28th of September, 1826, with Messrs. Marc and Denis, to examine at the morgue, the dead body of a male child, born at the full time, having been eight or nine days dead. All its parts were reduced to a state of complete

putrefaction, the cavities were distended with gas, the substance of the lungs was completely putrid, and the umbilical cord, which appeared not to have been tied, itself partook of the general decomposition of the body. Its length was about four inches, and near the umbilical ring, the envelope of the cord was simply a thin pellicle, through which the umbilical vessels could be seen; and in the place of being dry, flattened, and twisted, as is usually the case, it had formed a puckered sack at the extremity; in the interior of which, the gelatine of Wharton had disappeared; this sack resembled a membranous case, with transparent walls, analogous to a portion of intestine, distended with air and dried. The epidermis upon the abdomen was removed as soon as it was touched, and yet the membrane of the cord, and the cord itself, was firmly adherent. We ought not to confound this condition with the proper desiccation of the cord, it having, in the instance before us, undergone a real decomposition, not producing its separation, because the circumstances which effect this during life, had not existed. I have remarked in general, that the putrefaction of the cord does not commence until after the decomposition of the other parts of the body, so that it is never found putrefied, unless the walls of the abdomen are green, and all the parts of the body evidently in a state of putrefaction.

§ II. *Separation of the umbilical cord.*—This phenomenon is explained in different ways. Haller and Munroe attributed it to a kind of gangrene; and the celebrated physiologist of Berne, explains it in the following manner. “Funiculi quidem ombilicalis particula quam obstetrices solent cum abdomine parvuli conjunctam relinquere abit in sphacelam, quassi ambusta et post biduum, triduumve dilabitur.” This opinion has been maintained by a great number of physiologists. Other explanations have been given in relation to this phenomenon. M. Gardien regards the constriction of the epidermis as the cause of the separation. Chaussier attributes it to an inflammatory action, developed at the umbilicus; this opinion is also adopted by Béclard, professor Orfila, and M. Capuron. And lastly, Dr. Denis, who has made upon this subject some interesting researches, asserts, that during the process of desiccation, the masceration of the base of the cord, by a mucous secretion, the retiring of the skin, and the putrid dissolution of the substance of Wharton, produce by degrees the

separation of the cord. These physicians have observed a kind of separation at the base of the cord, under circumstances which we will hereafter notice more particularly; it is, however, not constant, but, as will be shown, is purely accidental. As to the opinion of Haller, it falls of itself. Let us admit then, for the present, the explanation we have given of the separation of the cord, and proceed to examine the facts which support the assertion.

The period of the separation varies very materially. Among the number of infants mentioned above, there were twenty-one where the cord had separated, but in only sixteen of these, was it of recent occurrence. There were two in which the cord separated on the second day, three on the third, six on the fourth, three on the fifth, one on the sixth, one on the seventh day—the cord of the last child fell in my hands while I was making an examination—and one on the ninth day. In another, on the ninth day, the umbilicus was dried and cicatrized; in one on the tenth day, the cutaneous ring rather small, and slightly projecting. In another, on the fifteenth day, the cicatrix was perfect, while the umbilicus was large, projecting, and surrounded by a red circle. The fourth or fifth day, then, appears to be the time at which the detachment of the cord is ordinarily effected, although it may occur equally before or after this time. It usually shrinks on the first day, and the desiccation immediately succeeds. This desiccation is complete towards the third day, and it is on the fourth or fifth day that the cord is separated from the abdomen. In giving these general rules, I wish it to be particularly understood that they are subject to many exceptions, as we shall presently see; and it appears to us very difficult to indicate from these data, the precise age of the infant. Not much importance, therefore, should be attached to it in a legal point of view.

We agree perfectly as to these various periods with the authors who have written upon the subject about which we are now treating; but particularly with M. Gardien, for according to him the umbilical cord usually separates from the fourth to the fifth day. Professor Orfila says, in his "*Leçons de Médecine Légale*," that the umbilical cord begins to dry away on the first day, and that it is usually separated on the fourth, fifth, or sixth

day. M. Denis also says that it dries about the fourth day, and that its separation is effected on the fifth, sixth, seventh, or eighth day.* These results are, as we see, very varying, particularly if the numerous exceptions already given are borne in mind.

It is nevertheless in our power to draw some inferences from these data, if we recollect the causes which produce the variations, and that they are not the effect of chance, as I shall endeavor to show in considering attentively the phenomena attending the separation of the cord.

In the first place, let us notice that the attachment of the cord to the abdomen, is exhibited in two different ways; it is either broad at the base, and the cutaneous ring with which it is surrounded well defined, often shooting forth to the distance of four to six lines up the cord, or else it is slender, with the cutaneous ring but little projecting, already wrinkled into folds, and presenting in some degree the appearance which it will have when the cicatrix at the umbilicus is formed. In the former case a suppuration, more or less abundant, occurs at the base, and the cutaneous ring, often becoming inflamed, exhibits a red circle, which frequently remains for a considerable time. In the latter, the cord generally dries away without any suppuration, and the inflammatory circle is not very evident, the desiccation alone producing the separation. This is effected in the manner pointed out above, and is more particularly evident in the dog, where the umbilical cord dries and falls at a very early period. But before going farther, the following facts will suffice to establish the distinction indicated. Of the 86 infants to whom reference has been made, one, at the age of one day, exhibited the cord fresh, with the umbilicus projecting, red, and tumefied, but without any appearance of suppuration. I also observed the redness of the umbilicus with tumefaction without suppuration, in seventeen infants. In three, aged one day, the cord was dried the half its length in the first two, and entirely dried in the third. Six others had arrived at the age of two days. In the first the cord was dried, and in another partially so; the same with the third and fourth, in whom the cutaneous ring was very projecting. The cord was dry in

* The separation has sometimes not occurred until the tenth day, or even later.—S.

the fifth, large and moist in the sixth, and abounding with blood at the base. There were four of the age of three days; one had the cord dry, another a little shrunk, the third dry and thin, and the cutaneous ring slightly projecting, while the fourth was dry. Two were of the age of four days, with the cord still humid at the base, and two thirds of its length quite dry; one of five days, where the separation of the cord was recent, and the umbilicus still humid; and one of fifteen days, in whom the cord had fallen some time before, the umbilicus cicatrized, and the cutaneous ring quite projecting and surrounded by a red circle. Such were the different states of the umbilical cord in the infants where the umbilicus appeared red and tumefied without suppuration. We will now see the condition of the umbilicus in eight infants, where, besides redness and tumefaction, a perfect suppuration existed. There was but one of the age of one day. The cord in this one was dry, the umbilicus a little projecting, and the surrounding red circle very small. Three others were two days old; in one of these the cord was dry at the summit, its insertion large, and the cutaneous ring very prominent. In the third the cord had recently fallen. In three infants three days old, there were two where the cord was dry, and in the third, a little shrunk. Lastly, there was one aged five days, where the cord was dry and very large at the point of insertion. There was but one infant of the age of three days, in whom suppuration existed at the base of the cord, without surrounding redness. Thus out of eighty-six infants of different ages, only twenty-six exhibited traces of inflammation around the umbilical ring. This inflammation, then, is not indispensable to the separation of the cord,—it is not even a concomitant attendant,—since I have never observed it, notwithstanding the most scrupulous attention, in the sixty-one infants, completing the entire number of those to whom I have particularly directed my researches. It should be remembered that I make a distinction between the suppuration at the base of the cord, and the oozing from the umbilicus which follows its separation. In no instance in these sixty-one cases did the cord exhibit any putrefaction, but nothing more than a simple desiccation. I have often seen the cord separate in the manner above mentioned without the concurrence of any inflammation. We should not, therefore, attach much importance, as

has been done by some distinguished writers on legal medicine, to the absence or presence of a red circle around the umbilicus, when we are examining the dead body of an infant to determine whether it died before, during, or after birth.

This inflammatory redness proceeds from a cause which I will now endeavor to explain. It is worthy of observation that the redness and suppuration were not manifested except in about one fourth of all the cases which form the subject of these researches, and that the umbilical cutaneous ring in children exhibiting this phenomenon, appeared very distinct, and the cord abounding in gelatine was attached by a large surface to the abdomen. Ought we not, therefore, to attribute this inflammation to the projecting of the umbilicus, by which it is exposed to the rubbing of the clothes and the friction of the dried cord? and can we not find in the gelatine of Wharton, or in the cellular tissue, which together surround the vessels of the cord, the materials of the suppuration? This redness is often partial, and is not manifested except at that portion of the cord which has suffered compression. At other times the inflammation appears and disappears several times, whether the cord remains attached, or whether it has been for some time separated; and it is not uncommon to see it remain for several weeks, producing an erysipelatous affection on the parietes of the abdomen. In order to avoid the irritation produced by the contact of the indurated cord upon this part, we ought carefully to remove a portion where it has dried, and always to apply a compress upon the umbilicus, through the centre of which a suitable opening has been made to allow of the passage of the umbilical cord.

Since, in the separation of the cord, two phenomena have been presented, in the one case the umbilicus inflaming and suppurating abundantly, while in the other the separation is produced by a simple desiccation, accompanied sometimes by a slight oozing from the base, but without any real inflammation; we will inquire in which of the two the cord soonest undergoes separation. The following facts will answer this inquiry. In twenty-one infants of whom I have before spoken, when the cord had fallen off, there were only three with the red circle around the umbilicus. One, aged five days, exhibited this redness without suppuration; another, aged three, had the redness with sup-

puration; in the third, aged fifteen days, where the cord had been for some time separated, the red inflammatory circle existed, while the remaining eighteen had not the least redness. I have before said that twenty-six infants exhibited the trace of a severe inflammation at the base of the cord, and upon the whole of the umbilical ring; now in almost all these, although of different ages, the cord at its insertion was perfectly solid, and not at all dried at the base, consequently inflammation at the base of the cord is by no means a condition necessary to accelerate the separation; on the contrary, it occurs in cases where the separation is generally more slow, for the cords most abounding in gelatine are the most ready to suppurate. We know that the desiccation of the base of the cord is one of the conditions necessary to its separation, but the abundance of gelatine retards this process; consequently the cords that are provided with the greatest quantity of this gelatinous matter, are much slower in separating. Reasoning and analogy are here mutually sustained, for I do not reason except from facts. However, as it sometimes occurs equally in a thin ring, in which a cord more or less slender is inserted, a premature separation of the cord may possibly occur even in cases of umbilical inflammation; this circumstance is, however, rare. This inflammation must be considered as purely accidental, and not as an indispensable occurrence to the separation. Yet we find in the cases communicated to Professor Orfila, and recorded in his *Leçons de Médecine Legale*, that in all the subjects the red circle existed. M. Denis, in the synoptical table which he has given upon the different phenomena attending the separation of the cord, has been less exclusive, and according to my views, approaches much nearer the truth. From the preceding observations, it is evident that the separation of the cord is the result of the constriction which the indurated gelatine exercises upon the umbilical vessels at the umbilicus, and also of the continual pulling from this narrowed point of the cord so dried and fragile; and that there is neither gangrene of the cord, as Haller thinks, nor constriction of the epidermis, as is asserted by Gardien,—a constriction which so inert a pellicle could hardly exert; nor yet a contraction of the skin with inflammation of the umbilicus, as Capuron pretends; neither is it necessary that there should exist an active inflammation with suppuration, as has

been maintained by others,—this last condition having no existence except in peculiar circumstances. Besides, it is well known that inflammation and suppuration of parts in which vessels are often found, will not always cause the rupture of the latter. Veins and arteries are often seen remaining healthy in the midst of large abscesses. Bécclard has observed that arteries in inflamed parts hardly ever inflame. Dr. Bérard, in his inaugural dissertation, has given a remarkable fact in support of this opinion. If this be so, how can it happen that an active inflammation of the umbilicus is necessary to produce a rupture of the umbilical arteries and vein, that the separation of the cord may be effected?

§III. *Cicatrization of the umbilicus.*—In order to understand properly the changes which take place at the umbilicus after the separation of the cord, we must not lose sight of the two kinds of umbilical rings of which I have spoken; the one but slightly projecting and already corrugated, is usually found among the cords that are thin and small; the other very large and projecting, covering a large portion of the base of the cord, occurs where the cords are thick and moist. In proportion as the desiccation advances, the circumference of the umbilicus appears at first to gather in folds; and it often exhibits a double cutaneous ring, one within the other. The cord detaching itself in a circular manner, the umbilical circle becomes loose, forming a funnel-shaped hollow, at the bottom of which the cord may still be held by one or two vessels which soon separate. In this hollow will be found the ruptured extremities of the vessels, surrounded by cellular tissue, and maintained on a level with the aponeurotic circle which the *linea alba* forms at this point by a continuation of the *fascia transversalis*. All these parts sink gradually towards the cavity of the abdomen, the cause of which may be seen in the following explanation. The umbilical arteries and vein have, until the period of birth, partaken of the general growth of the body, but from that moment they become inactive, receiving no more blood, the diameter and length at the same time evidently beginning to lessen. The rapid growth of the infant during the first days of its existence, the increasing development of the parietes of the abdomen continually enlarge the space between the umbilicus and the termination of the umbilical vessels, the latter not undergoing development in a corresponding manner, they draw, as we may

say, towards themselves the umbilical ring, which, although projecting and conical at first, soon presents a depressed and funnel-shaped surface. This force is counterbalanced by the aponeurotic ring of the *linea alba*; there is then formed, according to M. Denis, a kind of sac, at the bottom of which appears a species of suppuration, not to be confounded however with that resulting from the disorganization of the base of the cord in certain cases. The cord at its insertion is often perfectly dry, whilst the funnel-shaped hollow of the umbilicus forms the suppuration to which we have just alluded. It is entirely different in composition from ordinary pus, the result of inflammation: at first the skin about the umbilicus, always a little excoriated at the place of separation, becomes a kind of mucus membrane secreting a puriform fluid, and the cellular tissue at the same time itself secreting pus. In the centre of the umbilicus is seen a soft tubercle more or less red, formed by the extremities of the vessels re-united, which disappearing by degrees, is at last imbedded in the abdomen. Sometimes this tubercle inflames, becomes fungous, and forms in the centre of the cutaneous ring an excrescence requiring cauterization. The umbilical vessels form at their point of union an angle which opens in proportion to the retraction of the umbilicus, and when the hollow is deep, the skin, gathering in a circular manner, unites with much more facility as its borders are a little excoriated, and an adhesive inflammation is here formed. At this time the skin exhibits a cicatrix crossed by several small white lines at the point of its union; continuing without alteration during life. The skin appears to be drawn to the bottom of the umbilicus by means of the cellular adhesions which unite it at the lower part of the sac with the umbilical vessels, and these adhesions becoming closer and more solid at the internal surface of the cutaneous fold, it is thus constricted in all its circumference by the aponeurotic circle of the *linea alba*.

When the cicatrization at the bottom of the umbilicus is completed, the umbilical ring assumes internally a new form, it is no longer circular, but has two edges,—the one superior, often very thick; the other inferior, and almost always thin. It becomes crescentic in its shape, the convexity of one border corresponding with the concavity of the other; by which a semi-circular hollow is formed in the centre of the umbilicus, the concavity of

which has sometimes a superior and sometimes an inferior aspect ; more frequently however the latter, as the drawing of the umbilical arteries is much greater than that of the vein. The progressive growth of the abdomen, its fat or lean condition, etc., often modify the shape ; but such is the original form of the umbilicus in most cases. When it is so found in the dead body, and should there also be at the umbilicus a puriform oozing, we may infer that the separation of the cord had been recent. M. Denis has described two circles ; one, which surrounds the cord before its separation, by the name of the temporary cutaneous ring, and that which remains during life by the appellation of permanent ring. This distinction is quite proper, but he has erred in calling the form circular ; it is such as I have above described. The two opposing edges are evidently the effects of the umbilical arteries and vein in opposite directions. This drawing is ordinarily greater at the lower than at the upper border, and the superior edge is almost always observed to cover the inferior.

From the 10th or 12th day the cicatrization is complete, and the oozing from the umbilicus ceases ; this, however, varies considerably. The cicatrix is sometimes closed sooner, and the form of the umbilicus is one of the causes of the length of time required for its accomplishment. If the ring be thin and the cord small, it is very soon effected. If, on the contrary, the ring be voluminous and extend very much up the cord, the retraction and cicatrization are much more slow in their progress. Thus, when a cicatrized umbilicus is observed in an infant, we should bear in mind these differences in the umbilical ring. In general, when the ring is thin and the cord slender, the desiccation and separation of the cord and the cicatrization of the umbilicus will terminate before the 10th day. If we meet with a very projecting umbilicus, as it corresponds probably with a thick cord, we may conclude that the cicatrization was not completed until after the 10th day.

A variety of pathological causes, such as inflammation, hernia, or certain monstrosities, may retard the progress of the cicatrization, or cause it to be varied in form. Each of these diseases will be considered in their proper place in the course of this work. I will not therefore stop to describe them here. Upon examining the centre of the umbilicus with attention, a sort of hardened

tubercle will be seen, produced by the obliterated extremities of the arteries and vein united. As the infant advances in age, this space becomes narrower, the tubercle and the umbilical centre sink inward, the edges of the cutaneous ring approach, and become almost in contact, while a true cicatrix forms, and solidifies on a level with the vascular tubercle, which retracts more and more in drawing to it the irregular centre of the umbilical cicatrix.*

• CHAPTER IV.

ON THE EXFOLIATION OF THE EPIDERMIS.

ANOTHER phenomenon not less interesting than that we have just been considering, is the separation of the epidermis, which takes place at an indeterminate period from birth.

This exfoliation of the epidermis will be examined, 1st. In reference to the period of its occurrence, 2dly. The manner of its operation, and 3dly. The physiological and practical inferences which may be drawn from it.

The epidermic exfoliation does not occur until after birth. I know of no case where it has ever commenced before, and it is worthy of remark, that premature children have never exhibited this phenomenon; some time must elapse, and the infant arrive at a certain age, before it occurs. Authors on legal medicine have endeavored to draw certain inferences from the separation of the epidermis, in relation to the age of the infant; and M. Orfila being desirous of examining closely the statements of Chaussier, M. Capuron, etc., upon this subject, has, in connexion with M. Thierry, made considerable researches, from which he has concluded that the epidermic exfoliation exhibits at first a preparatory stage, next an elevation of the epidermis, and lastly, its separation. According to him, the preparatory stage can be observed from the sixth to the eleventh day; the elevation of the epidermis on all parts of the body, from the twentieth to the thir-

* See Appendix.

tieth day, and the complete exfoliation from the thirty-fifth to the fortieth day. These authors also state, that certain diseases retard or suspend this process. Before offering my own opinion upon the subject, I will exhibit the facts I have gathered, and the natural inferences flowing from them.

The eighty-six infants among whom my researches were made, in relation to the umbilical cord, have equally served my purpose in clearing up the point now under consideration.

The exfoliation had not commenced in forty-two; fourteen of them were of the age of one day, eleven of two days, nine of three days, five of four days, two of five days, one of nine days, and one of ten days. From this it appears, that the commencement of the process is extremely variable; however, it must be observed, that far the greater number where it did not exist, were of the age of one or two days, consequently it does not occur immediately after birth. We will now see what were the ages at which the phenomenon occurred; but before examining the subject any farther, let us consider the manner in which it is effected.

I have not been able clearly to observe the preparatory stage of which Orfila and Thierry speak. The latter is not sufficiently explicit as to what he means by it; I believe that as soon as the skin breaks, a true elevation of the cuticle takes place. There can be but two well-defined periods in the epidermic exfoliation,—the raising of the cuticle, and its separation. The elevation occurs in three different modes; in lines or ridges, in large plates, or in furfuraceous scales; this has been noted by Orfila. These varieties depend on the part of the body affected; thus the lines or ridges occur in the flexures of the joints, in the groins, in the folds of the arms, etc. The broad plates are formed between these folds upon the chest, often at the bottom of the foot, and sometimes upon the abdomen. The furfuraceous scales are seen about the sternum, under the armpits, on the cheeks, between the shoulder blades, upon the shoulders, back, etc. I have noticed with great care these different modes of exfoliation, and have also paid close attention to the age at which it most commonly begins, and the manner of its occurrence.

Among the number above mentioned, there were forty-four exhibiting the exfoliation; but to present the various phenomena

in their proper order, I shall divide these cases into three classes. Where the exfoliation had commenced, where it was in a state of full activity, and lastly, where it had terminated. The epidermis was observed to commence its elevation in eleven children in various parts of the body, either by lines, or furfuraceous scales, but it was easily to be seen that it had commenced its detachment from the skin; for in pinching or rubbing the skin, it appeared to move under the fingers; it was also remarkable for its dryness, and its appearance contrasted strongly with the other parts of the body where the skin was smooth, and the epidermis united and perfectly adherent to it. This condition was apparent more particularly at the abdomen, the slightly roughened appearance of which, had a great resemblance to the pellicles which form on the surface of milk, when at the point of ebullition. On the next and the following days, the lines and the numerous scales were developed on the surface, and the separation of the epidermis followed as in other infants. It is, perhaps, this peculiar condition of the epidermis which has been denominated by Thierry, the preparatory stage; however this may be, it is not an indispensable occurrence to its detachment, for it is very rarely met with, since the exfoliating lines often form without any preliminary symptoms. Of the three children of whom I have just spoken, one was aged three days, another one day, the third two days. There were only eight children who presented some faintly formed lines on the abdomen, or on the base of the chest; three of these were aged one day, three two days, one three days, and one four days. In the three aged two days, small scales were seen in the axilla, and lines in the folds of the neck and groin. I believe that the exfoliation of the epidermis may be considered as having commenced in all these children, but their ages varied so much, that it is impossible to say precisely at what period it usually commences.

The exfoliation was at its height, that is to say, extensive scales, or extensive zones of the epidermis, were raised at different points of the surface of the body, in thirty-two children; only one was of the age of one day, seven were of two days, eight of three days, six of four days, six of five days, one of seven days, two of nine days, and one of fifteen days.

From three to five days, then, appears to be the age at which

the epidermic exfoliation is at its greatest height. I have already said that it was not observed in forty-two children; I will add, that there are instances where it occurs, as we may say, insensibly, for none of these children presented the exfoliated lines or plates, as we have just described them. The epidermis, in such a case, comes off in a dust; and the different periods of exfoliation cannot be observed. This ought therefore to be denominated the insensible exfoliation of the epidermis. Being unable to assign any cause for this difference, I have limited myself to the simple mention of the fact.

The duration of this process is very variable. It has continued until the thirtieth or fortieth day, and even for two months. Often its duration is much longer, and it is very strongly marked in those children who have become affected with marasmus, the flaccidity of the integuments allowing the epidermis to become detached in large scales. It is doubtless from this fact that M. Thierry has given it as his opinion, that gastro enterites retards the exfoliation. We must not, however, confound the retarding of the process with its prolongation; let us rather attribute the promoting of it to the state of dryness and flaccidity of the integuments, to which condition they are reduced by marasmus. There exists in adults an analogous phenomenon, where disease has produced a rapid emaciation. In the course of their convalescence, according to the popular phrase, they change their skin. It appears as if nutrition had been entirely suspended in those parts in which it naturally proceeded in a feeble manner, and that the epidermis being thus deprived of its portion of blood, had become withered and dead. The effect, therefore, of marasmus in children, is to prolong the separation of the cutis.

The cause of the epidermic exfoliation in new-born children, is susceptible of a satisfactory explanation. The integuments of the infant are for about seven months immersed in a liquid which keeps them constantly supple and moist. The epidermis, until the period of birth, is, as it were, soaking in the waters of the amnios. When exposed to the air, it becomes suddenly dried, and loses the suppleness peculiar to it during the intra-uterine existence. Hence results a cracking and scaling of the epidermis, and its final separation in the form of plates or powder.

In proportion as the epidermic scales are raised, the epidermis

forms beneath in an imperceptible manner. The skin beneath the elevated scales is red, very irritable, and inflames with great facility. I have seen the epidermis on the scrotum of an infant entirely removed. The skin of this part being in contact with the urine, inflames, and becomes affected with severe erysipelas. The epidermis is very soon reproduced in those parts which are most exposed to the air, but the folds of the skin, as in the arm-pits, the neck, or groin, or any other parts deprived of a direct contact with the air, secrete a fluid like that formed by mucus membranes. This is easily dried up, in assisting the formation of a new epidermis by the use of absorbing powders. This circumstance serves to prove that the epidermis is only a cutaneous secretion; a covering almost inorganic, being destroyed and re-established according as the cutaneous surfaces are exposed to the action of the air, or are kept from its direct influence.

The elevation of the epidermis in young infants favors very considerably cutaneous absorption, since the absorbing surface is no longer covered; a circumstance not to be overlooked in therapeutics, for we may, by means of the skin, introduce substances into the system, often difficult to administer in the usual manner. Endermic medication may very often be used with advantage.

Care must be taken not to confound the natural exfoliation of the epidermis with the separation which occurs from putrefaction; in the latter case, the surface of the abdomen is usually green; universal evidences of putrefaction exist, and when the epidermis is carefully raised, a number of very fine colorless filaments are to be seen, which break after being somewhat stretched. I have observed that these are not to be seen in the natural separations of the epidermis. Several anatomists, such as William Hunter, Bichat, and Chaussier, have regarded them as vessels, but as they are not observed except in a state of putrefaction, ought they not to be considered, as Beclard judiciously observes, as the *rete mucosum* rendered fluid and viscous by the commencement of the process of decomposition?

I have sometimes seen the exfoliation occur twice in the same child. It is not unusual to see children during the month, exhibit the natural process of epidermic exfoliation. If at the end of this period they should become emaciated by disease, the epidermis on the abdomen or limbs is again detached; it then raises in

very large plates, or in large zones on the abdomen, and furfuraeous scales exhibit themselves in abundance on various other parts of the body. The hands and feet exhibit then, more often than in the first instance the epidermic exfoliation, attributable in reality to the emaciation caused by the chronic disease under which the child has labored. If M. Thierry has observed this secondary exfoliation in children a little advanced in age, he has thought that the gastro enterites with which they were affected, had retarded its development, while on the contrary it was the cause of its existence. In this manner can the assertion on this subject in Orfila's work be explained.

It is difficult to establish any constant conformity between the separation of the epidermis or that of the cord, and the age of an infant; and even the attempt to draw any general consequences from these two phenomena have been in vain. The result, however, of these considerations, is, that the epidermic exfoliation of young infants is a natural phenomenon, and is decidedly one of health.

CHAPTER V.

OF THE SIZE AND WEIGHT OF THE INFANT.

FROM the time of birth to the seventh month the infant grows rapidly, assimilation proceeds with great activity, and it acquires a considerable size compared with what it had at the time of birth; the limbs also enlarge in a very remarkable manner.

Professor Chaussier has remarked, that the embryo increases at the rate of two inches a month; whence it must follow that at the period of birth it will be about eighteen inches in length. This, therefore, ought to be the size of an infant when first born, according to the calculation of this celebrated anatomist.*

I have measured a number of infants from the age of one day to that of a month, in order to have a precise knowledge of the

* *Table synoptique des mesures relatives à l'étude et à la pratique des accouchemens.*

size of newly born children, without regarding the growth of the embryo. The following are the general results of these researches:—

I took by chance, and without distinction of sex or age, fifty-four children, in order to ascertain the mean size. Of these there were seven of the age of one day, born at the full time; one measured sixteen inches, two seventeen inches, two fifteen inches six lines, one nineteen inches, and the other eighteen inches. Of three children, apparently born before the full time, and aged one day, one was twelve inches in length, another fourteen and a half, and the third fifteen. There were three aged two days; one was seventeen inches, (female;) another the same; and the third nineteen, (male.) There were six aged three days, (males,) feeble and apparently born prematurely; the first three were each fifteen inches six lines; the fourth fourteen inches three lines; the fifth (female) was seventeen inches; the next (male) nineteen; one of four days, (male full grown,) was sixteen inches four lines; three, aged five days, were—one fifteen inches six lines, (female,) another seventeen inches, (female,) and the third seventeen inches two lines; three were aged six days, one (male) was seventeen inches, another (female) seventeen inches one line, and the third (female) sixteen inches. In four infants aged seven days, there was one (male) seventeen inches five lines; another (male) seventeen inches six lines; another (female) fifteen inches ten lines; another (male) seventeen inches; three were aged eight days, one (female) seventeen inches six lines, another (female) seventeen inches nine lines, the third (male) seventeen inches; of two aged nine days, one measured nineteen inches eight lines, the other one (a female) seventeen inches six lines; one of twelve days, (male,) nineteen and a half inches; three of fourteen days, (two of these females,) were seventeen inches, and the third (male) sixteen inches six lines; one aged seventeen days, (female,) seventeen inches six lines; three of eighteen days, the first (male) seventeen inches three lines, the second (female) eighteen inches six lines, the third (male) eighteen inches; one aged twenty days, (female,) eighteen inches six lines; one aged twenty-one days, (male,) nineteen inches; five aged one month, the first of these (female) measured sixteen inches six lines, the second (male) seventeen inches eight lines, the third

(male) nineteen inches, the fourth (male) sixteen inches six lines, the fifth (female) seventeen inches four lines.

From this exhibition it will be seen that the size of the children measured did not exceed eighteen inches, and that the greatest number were about seventeen inches; since, in the fifty-four of whom we have been speaking, there were twenty-two measuring seventeen inches, and only four measuring eighteen; the remainder nineteen, sixteen, or fifteen inches. From sixteen to seventeen inches, then, appears to be the ordinary size of newly born infants.*

The facts show that it is impossible to assign any size as common to all young infants; they differ in this respect almost as much as adults. Some are born with a high degree of vigor, and appear large and strong; while others, small and debilitated, bear the impress of a feeble constitution, which they carry with them through life. All the varieties of size, strength, shape, and color exhibited in the human species, are evident in the cradle.

Professor Chaussier, in the synoptical table of which mention has already been made, after having designated eighteen inches as the usual size of a child born at nine months, has thought proper to qualify his general assertion, and adds:—"Sometimes we see a fœtus born at the full time not more than fourteen or fifteen inches in length; at other times they have been seen measuring twenty-seven inches, an instance of which has been reported by Millet."

It is difficult to establish exactly the growth of a child in each month, from birth to the age of seven or eight months. Children exhibit in this respect difference according to their constitution, and the diseases which affect them at this period of their life. I have not sufficient data upon the subject to allow of its consideration in this place.

As to the weight of a new-born child, it deserves but a secondary consideration. It has been exactly established by very close observers,† who agree in stating, that at nine months an infant weighs from five to five pounds and a half. Chaussier says that children are sometimes found, born at the full time and quite active, weighing but one thousand three hundred grammes,

* See Appendix.

† Chaussier, Baudelocque, &c.

(about two pounds and a half;) others, one thousand seven hundred and fourteen grammes, (a little more than three pounds and a half.) Generally their weight is between six and seven pounds; they are rarely seen weighing four thousand four hundred grammes, (about nine pounds;) they have been seen, but very rarely, weighing six thousand eight hundred grammes, (about twelve pounds.) Baudelocque saw one which weighed five thousand three hundred grammes, (or about eleven pounds;) but how can we believe, as has been asserted by some, that there have been infants weighing more than twenty-three or twenty five pounds?

CHAPTER VI.

OF THE MEANS OF EXPRESSION IN THE INFANT.—THESE ARE LIMITED TO THE CRY AND EXPRESSION OF FACE.

ARTICLE I.

OF THE CRY CONSIDERED IN RELATION TO SEMEIOLOGY.

SECTION I. *Analysis of the cry.*—When we give but a slight attention to the cry of a child, we hear nothing but a uniform noise; the vagitus, or cry of a new-born child, is always easily distinguished from the other noises which constantly strike the ear; but if we listen more attentively, we shall discover that the cry is composed of two distinct parts, the one sonorous and prolonged, only heard during expiration, ceasing and commencing with it, and caused by the air passing from the lungs through the glottis. This is the proper cry. The other part is produced by inspiration; the air in passing through the glottis, in order to reach the lungs, is compressed by a kind of spasmodic contraction of the vocal muscles, giving a shorter, more acute sound than the proper cry, and often less perceptible; it is an interval, a sort of effort at renewal between the cry just finished and that

about being commenced. Often the cry exists alone, and the sound of the interval or reprise is not heard at all ; or the reprise is heard, while the cry is stifled. The cry and the reprise often have very important modifications with which it is necessary to be acquainted, and which we will hereafter point out.

The younger the infant, the less is the reprise heard ; it very sensibly increases as the child advances in age ; the sound varies from the whistling of the blowing of wind to that of the shrill voice of a young cock. It appears to augment in intensity in an inverse ratio to that of the cry. When the child, after having cried a great deal, becomes exhausted by fatigue, want of sleep, or pain, the reprise then predominates ; this is the sound which is heard from time to time in the sobs of a child, finally terminating in profound sighs elicited by the recollection of recent pain.

The peculiar tone of the cry varies as much as the voice in adults ; it exhibits in each infant particular modifications which it is difficult to describe, but which are easily discerned by the ear. The heart of a mother responds not to the cries of strange children, but her own cherished one is immediately recognized among all others.

From what we have seen, the cry is really nothing more than a sonorous inspiration and expiration. The infant might therefore be expected to exhibit, while crying, the effect of painful and forced respiration in the muscles of the face and trunk. Mr. Charles Bell has demonstrated by his experiments, that the *portio dura* of the seventh pair of nerves is the respiratory nerve of the face ; that is to say, its office is to transmit the power of mobility to those muscles controlling the various openings through which the air passes to the lungs. Now, during the crying of a child, the motions of all the parts concerned in respiration become, as we may say, convulsive, and whilst the diaphragm and thoracic muscles are contracted with considerable force, those of the face at the same time act with great power, and give to it a peculiar expression. It is well known that these motions among the muscles of the trunk and face, are owing to the anastomosing of the branches of nerves of these parts. When we examine a child about commencing to cry, we shall see that the face reddens, the inspiratory motions become strong, the mouth opens, exhibiting the borders of the gums ; the tongue is

sometimes agitated by a slight convulsive movement, the nostrils dilate, the eyes close, the eyelids swell, three or four vertical lines appear at the root of the nose, others also on the forehead; they cross each other in all directions, and vary considerably as to their number and direction. At every movement of expiration and inspiration they alternately appear and disappear. If the crying is prolonged, the infant will at the same time move its limbs, following the elevating and depressing motions, as if to assist the dilating muscles of the chest. It sometimes happens at first, that these different muscular contractions, and these painful efforts at inspiration, are not accompanied with any noise; they are soon succeeded by a short cry but little sustained, then followed by a continued cry, terminating finally in a full and sonorous sound. It also happens that the reprise is at first soft, and cannot be heard but for a moment. Often three or four cries will follow each other in quick succession, then a little interval will be heard, to which succeeds a cry of much longer duration than the preceding, at last terminating in a sound somewhat resembling that of the bleating of a goat.

Whilst the child holds its breath the mouth remains open, and the face is in a state of permanent contraction, until the laborious effort at respiration is at last terminated by a violent cry, apparently the result of this long and distressing exertion.

This alternate succession of crying, of respite, and of muscular contractions of the thorax and face, is observed while the agitation of the child continues; as soon as it becomes more calm, the harmony between the inspiration and expiration is re-established, and the cry is less intense. The reprise is now much more easily distinguished, the wrinkles in the face disappear, the mouth gradually closes, and a universal calmness takes the place of the disturbance which we have just described.

It is an important fact to notice here, that very young children never shed tears while they cry, or at least, it is of very rare occurrence. The secretion of the lachrymal gland is excited, as is well known, immediately and sympathetically by sorrow; but are children at the tender age of which we are speaking, under the influence of mental emotions? Is this secretion produced by any other influence than the nervous excitability proceeding from some moral cause? And are physical distresses, which ap-

pear to be the only kind endured by a being whose brain cannot as yet combine ideas, and from which there appears to emanate no volition capable of acting on this gland? These are questions which it is difficult to answer. The lachrymal gland at this period is perfectly developed, it receives arteries and nerves, and does not differ anatomically from other glands. Notwithstanding this, no tears flow while the child is crying; and while the simple recollection of a lost friend, dear to us, will fill the eyes with abundance of tears, yet in the young infant, in spite of the reiterated cries from sleeplessness, sickness, and pain, the lachrymal secretion remains undisturbed; a fact deserving the attention of physiologists. It is a remarkable example of the particular influence of the nervous system on the functions of certain organs of the body.

Such is the analysis of the cry of a new-born child, and such is the exhibition of the accompanying phenomena. Now, that we may understand the mechanism, if we may so speak, of this physiological phenomenon, let us exhibit the causes which produce it, and endeavor to seek for a satisfactory explanation.

SECTION II. *Of the causes and of the expression of the cry.*—What produces the first cry? It is generally believed to be pain, produced by new sensations which the infant experiences; such as the impression of the air upon the body suddenly exposed to a temperature much colder than that to which it has been accustomed, the contact of the clothes or of the hands, the action of the light upon the sense of sight, and probably by the introduction of air into the lungs, which are now for the first time exposed to its action.

The child gives well marked evidences of the excitation it receives, by the rapid movements of the limbs, sometimes by sneezing, and always by cries. The accoucheur ought to be particularly attentive to the manner, duration, and nature of the cry, during the first moments of extra-uterine existence, because particular modifications form a suitable index of the complete or incomplete establishment of respiration, as well as of the healthy or diseased condition of the lungs. But we will return hereafter to this subject; let it suffice for the present to observe that an infant should be considered as vigorous and in a good condition, when the cry is well sustained, sonorous, and easy; such a cry

is always the result of a deep and free inspiration, indicating, accordingly, the existence of vigor and health. We sometimes, however, see children of a full size, with robust limbs, scarcely breathing, and crying with difficulty, perish from asphyxia or apoplexy; whilst others, much more weak, judging from the external appearance of their bodies, full of life, if we consider the power of their cries, undergo without danger the changes which occur so suddenly in the system, in passing from the uterine to the extra-uterine existence.

When these sources of irritation so productive of new sensations are removed, the cries then proceed from other causes. Thus, they are excited by some want, by distress, or by pain. It is important to be able to distinguish the various causes, that they may either be mitigated or removed. The general uneasiness which a child experiences after being rolled in its envelope, is often the cause of its cries; it is true, that the general practice of bandaging infants as was formerly the custom, has ceased, yet there are many places where the eloquent voice of the philosopher of Geneva has not reached, and we may see almost daily at the Hospice des Enfants Trouvés, in Paris, the sisters, servant-maids, or nurses, in dressing the child, often make it more like a solid packet, than clothe it in such a manner as to allow of motion in the limbs, or of free respiration. If an adult should be placed in a bed under the same torture, says Rozen, so often inflicted on children, would he not regard it as an insupportable torture? but we are destitute of pity for these helpless little creatures. After being in some degree habituated, they will be enabled to support for a time the compression of the bandages, and the want of sleep, more imperious than are all the other sensations, produces a momentary calmness, and the child at last yields more to the fatigue it has undergone, than to its natural desire for sleep; but no sooner is the first necessity for sleep satisfied, than the uneasiness again distresses it, and the crying is recommenced. It is observed in the wards of the Hospice des Enfants Trouvés, when one child begins to cry, all the others follow forthwith. There needs but one to disturb the repose of a whole ward; and all being awakened by the crying of one, they again experience the uneasiness or pain from which sleep had for a short time relieved them.

The crying may sometimes be found to proceed from the uneasiness which the child experiences from a portion of its clothes or the bedclothes being badly arranged; when from this cause, it may easily be remedied by loosening the bandages and otherwise arranging the clothes. We may also remark that when an infant experiences nothing more than a slight uneasiness, it only cries at intervals, and that it is calmed by the least diversion.

The want of food also will cause a young child to cry. We may ascertain whether this be the cause, in considering the length of time that has elapsed since it has sucked. We should not, however, in every instance conclude that hunger has produced the cries, where it becomes calm upon taking the breast, for some children have a remarkable voracity, and will not for a moment leave the breast. The stomach in such a case is overloaded with milk, rejects almost every instant its superabundant load, or it becomes the seat of an inflammation very difficult to subdue. Under such circumstances, we should use the greatest care to regulate the hours of sucking, and endeavor by other means to calm its distress.

Lastly, pain is a frequent cause of crying. The cry caused by pain is remarkable for its strength, frequency, and obstinacy, and may be known by the particular expression of the face with which it is accompanied, very difficult indeed to describe, but which may be easily recognized by the general condition of the child, such as palidness, wasting, and an aversion to the breast. It may also be known by the assemblage of such symptoms as designate the existence of disease in some part of the body. The sound and form of the cry excited by pain, are likewise influenced by the organs affected; these modifications will be pointed out below.

Some children cry without our being able to discover any cause, and notwithstanding their continual restlessness and wakefulness, they are observed not to become emaciated. These children are distinguished by their obstinate cries, among all others in the wards of the *Hospice des Enfants Trouvés*, and they well deserve the appellation given them by their nurses, of wicked children. This continual excitement proceeds, without doubt, from a highly exalted sensibility, existing much more in

them than in others ; and crying being the expression of an uneasiness which it is natural in this way to divert.

It is important not to lose sight of what passes in the circulatory and respiratory organs while the child is crying. We have already seen that the physical agents of respiration are in a kind of spasmodic condition, whence results a considerable disturbance in the pulmonary circulation. The return of the blood to the left cavities of the heart, is attended with some distress, it remains stagnant in the lungs, and a reflux occurs in the right cavities, and from thence in the venous system generally ; a congestion thereby exists, producing the violet tint so common in children that cry with violence. I have seen children undergo a momentary asphyxia during a fit of hard crying. The lungs, heart, and even the brain, are exposed to congestions which may be fatal ; and we ought, consequently, to endeavor to calm or arrest the cries of children. Rozen has given us excellent advice upon this subject. "All the art of tranquillizing the child," says he, "consists in removing the occasions of his cries, and to divert him by some object that will fix his attention, so that he will no longer think of it, or at least that his attention may not be farther attracted by the cause of his uneasiness."

In order to avoid the occasion and to prevent the return of the crying, I think it would be proper to regulate the hours of sucking, to accustom the child to sleep in the midst of noise, to have it lightly clothed, to maintain such a temperature in the apartment that it is neither too hot nor too cold, and finally, to quiet its restlessness by the sound of some soft musical instrument, but more particularly by the most common and natural means of singing, a mode so easy and natural as to have become popular.

After having given the general history of the cry of newborn children, it now remains for us to consider the varieties of form, tone, and duration, according to various diseases.

SECTION III. *Alterations and varieties of the cry of young children.*—The cry exhibits varieties in the form, tone, and duration.—The form may be incomplete, laborious, and smothered.—The tone may be acute, grave, husky, and tremulous.—The duration may be short or frequent, and interrupted.

1st. *Alterations in the form of the cry.*—By incomplete cry, I mean that in which only one part is heard. Thus the reprise

is sometimes altogether silent, whilst the cry is distinct; on the other hand, the sound of the reprise alone exists. The former occurs when the lungs are healthy and perfectly permeable to the air; the child does not use all its muscular efforts during inspiration, so that the air traverses the glottis without any noise, and produces none except when it passes through on expiration. This cry is of little consequence; it is ordinarily observed in those children who, without being really sick, are very small and feeble; but it is not so with the smothered cry. This is almost always a certain indication of pulmonary engorgement or of inflammation. As I do not wish to advance any opinion not founded on facts, I will exhibit a summary of the observations which have led me to regard as demonstrated each of the assertions which I propose to make.

I have noticed twenty children where the reprise alone was heard with distinctness, while the cry was smothered. Six of these were born before the full time, (from the fifth to the seventh month;) in three of these cases, a day after birth, the air appeared not to have penetrated the lungs, for when these were put into a vessel of water, they soon sunk to the bottom, whether they were immersed in one mass, or previously separated in parts. In three other children, prematurely born, the air had passed into a portion of the pulmonary parenchyma, but the greater part was compact, without crepitation, and engorged with blood; in the remaining fourteen, the lungs were much engorged and hepatized, producing the impression that the air could not have penetrated these organs except with the greatest difficulty.

From these cases we can draw our first conclusions in reference to the cry of a new-born child; it is, that in those instances in which the reprise alone is heard, it is very probable that the air does not penetrate, has not penetrated, or has penetrated but very slightly into the lungs; this sign, joined with percussion and auscultation, will furnish a suitable diagnosis of the disease of the lungs. And when physicians are summoned to give their testimony upon the viability of a child, they ought to inform themselves particularly as to the nature of the cry. A child that has not respired may cry, but its cry will be of a peculiar kind, which should be observed with great care. Perhaps in this manner we might avoid contradictions so often occurring in a

court of justice in the examination of physicians, who by the docimasia of the lungs, state that an infant has not respired, while the parents and midwives affirm that they saw the child in question open its mouth, breathe, and cry.

The laborious cry is easily recognized by the efforts made by the child, the painful expression of the face, the difficulty experienced in the attempts to expel the air from the lungs, and by the peculiarity of its termination, as it almost always ends in a sort of dying sound, not being entirely sustained throughout. The cause of this cry is not always an affection of the respiratory organs. In six children, where I was struck with the extreme difficulty of crying, and where both parts of the cry were heard, two were affected with pleuro-pneumonia with effusion in the pleura, one with a gelatinous softening of the stomach, the fourth with cephalitis, the fifth with acute peritonitis, and the sixth with well-marked pericarditis. It appears as if the cry then derived its expression from the distress endured by the child; the painful cry which the observer can detect at the bed-side better than I can describe it here, will be but the necessary result, or at least the probable evidence, of the existence of a serious disease in some part of the body.—The smothered cry is sufficiently defined by its name,—no sound is emitted. The alternate motion of inspiration and expiration gives rise to a double respiratory murmur, with which there is sometimes mingled, at intervals, a slight sound of voice more or less acute. The smothering of the cry may arise from many causes. In eighteen children in whom the cry was entirely smothered, there were thirteen, who, having at first respired and cried perfectly free, were attacked with a severe pneumonia, and during the last days of their life their cries were entirely lost. On examining the bodies of these children after death, both lungs in each of them were found hepatized, the larynx and bronchiæ very much inflamed, and the large vessels and heart considerably congested with blood. In two others the larynx alone was violently inflamed, and the lungs crepitated slightly; and in the remaining three, who were born quite feeble, the respiration never had been well established, and the cry not at all heard; in two of these the respiratory organs exhibited the same sanguineous congestion as the preceding; the third was

restored by the application of a leech to each axilla; the cry was gradually established, and the child improved for a few days, and then died also. Upon examining the body, congestion in the back part of each lung was observed. It often happens that the cry of a child just born is entirely smothered, and is not restored except in proportion as the respiration is free and full. The cry also becomes smothered in the distress accompanying the disease of long duration, and which has reduced the child to extreme weakness; when at the same time the *Facies Hippocratica* is observed, it is a certain sign of approaching death. From what we have seen, the smothered cry is, like the incomplete, a very probable symptom of congestion and of inflammation of the lungs, and may be, also, of inflammation of the glottis and bronchiæ.

2d. *Alterations in the tone of the cry.*—It is necessary on this subject to notice with great care whether or not it is the sound of the reprise or the proper cry, that is altered. That which is called the acute cry, is usually produced by the effort at renewal becoming predominant and loud. Any one may be satisfied on this point by examining a child suffering from a severe anginose disease, or from the strangulation produced by the presence of a foreign body in the larynx, by malignant sore throat, or croup. This sound, which all authors compare to the crowing of a young cock, and which is so distinct in croup, is nothing more than the reprise or effort at renewal becoming louder and sharper, and also interrupted and jerked, by spasmodic movements of which the larynx becomes the seat during the course of this disease. In general, the reprise of the cry becomes acute every time the tonsils or larynx experience any irritation. When the child has cried a great deal, and consequently has irritated the organs of voice, the reprise soon assumes a very acute sound, whilst the proper cry ceases to be heard. The same occurs when the inflammation of the membrane lining the mouth is propagated to the tonsils and larynx. I have examined the bodies of three children, who, although they had not been affected with croup, had nevertheless exhibited the acute cry, the reprise with the characteristic interruption, very closely resembling the crowing of a young cock. In two of them, where there had been a violent affection of the throat, the inflammation extended

far down the trachea. In the third the tonsils were covered with a thick coating of mucus, which also surrounded the borders of the glottis, but the trachea was free from it and the lungs were healthy.

Both parts of the cry may be very acute without the existence of a particular lesion in the organs of voice. It is known that M. Maunoir, of Geneva, has heretofore remarked the peculiar sound of the cry of a child affected with acute hydrocephalus, and which he has, I believe, designated by the name of "hydrencéphalique." It probably is the effect of the excessive pain endured by the child, whose head is distended by a continually increasing accumulation of serum in the ventricles of the brain.

I think, therefore, that we ought to lay down as a principle, that the acute cry is almost always produced by the reprise, the tone of which is altered, and that this particular alteration of the cry in children is more often the sign of laryngitis or of laryngo-trachitis than of inflammation of the lungs.

The grave or sonorous cry furnishes but few indications of disease. I have seen but one child that was remarkable for a sonorous and harsh cry. This was affected with a slight enteritis, which was very promptly cured. I can only, therefore, point out the peculiarity of this cry, without being able to assign any cause for its existence.

The husky cry is often observed in catarrhal affections. The mucous r  le is heard at the same time. It appears as if the thick mucus which obstructs the bronchi  , hinders the air from circulating freely through the tubes in its passage to the glottis, at the opening of which there is not a sufficient quantity passing at one time to produce a clear and resounding effect. This alteration belongs more particularly to the proper cry than to the reprise, which usually retains its natural sound, although the contrary may exist. In twelve new-born infants, where the cry was of this character, the bronchi   of four of them were filled with mucus, and a violent anginose affection existed in the other two. The husky cry may then be considered as an indication of an affection of the bronchi   or larynx. It may likewise be observed in the sequel of simple or of pseudo-membranous phlegmasi   of these parts. A child that has had the good fortune to survive an attack of croup, retains for a long time an alteration in the sound,

both of the voice and cries, which remain, as has been observed by authors, almost always husky.

There is one peculiar cry of which I have observed but three cases, and which, by reason of its trembling and jerking manner, may be compared to the bleating of a goat. The reprise is more distinctly heard than the cry; both are faint, and have the peculiar sound which I have mentioned. The three children that exhibited this cry, were of the age of eight days, of three weeks, and of four months. They died from chronic enteritis; and in addition to this, the glottis was œdematous, and presented the appearance of œdematous inflammation, so that I have been led to believe that the tremulous cry is the distinctive sign of œdematous angina. I advance this opinion, however, with the caution which should accompany a conclusion drawn from so few facts.

3d. *Alterations in the duration of the cry.*—Whatever may accelerate the movements of respiration, will also cause a rapidity in the cry; the two parts composing it following with great rapidity, and three or four cries preceding one reprise. This kind of cry is usually produced by violent and sudden pain, such as that arising from the pricking of a pin, or from burning the mouth in drinking. It is also to be observed in colic, peritonitis, and other abdominal pains.

The interrupted cry exists in angina suffocativa, an affection which is more often a true disorder of the nerves of the respiratory apparatus. This cry closely resembles that which characterizes croup; it is in both cases owing to a change in the sound of the reprise; but both parts of the cry can be distinctly heard in the former affection, whilst in croup, the cry is entirely replaced by a blowing sound which succeeds each reprise. The interrupted or singultous cry, is also very irregular; it is produced and maintained by causes which render the respiration spasmodic, and it indicates great disorder of the immediate organs of voice. I have seen it in the highest degree in an infant four months old, who died after exhibiting symptoms analogous to those of croup. Upon examining the body, all the disease found was a mass of crude tubercles, about the size of a nut, in the posterior mediastinum, strongly compressing the trachea at the commencement of the bronchiæ. The diameter of the trachea was reduced about one half, by the flattening it had undergone,

so that the air could not pass through it without great difficulty.

We may draw from the preceding considerations, inferences which ought not to be forgotten in the semeiology of diseases of children at the breast. These are, that the changes in the proper cry, usually indicate an affection of the lungs or bronchiæ, whilst the changes in the reprise are ordinarily evidences of an affection of the trachea or larynx. If experience confirm this rule, to which there may still be exceptions, it will be admitted that the distinction we have made of two parts to the cry, is not a frivolous one, since it may be made practically useful.

As to the different varieties of the cry of the new-born child, of which I have just treated, there is no doubt that with a little imagination and the invention of new words, they might be multiplied almost *ad infinitum*; but I have confined myself to the distinctions already made, because I think it is easier to describe the modifications which the ear can detect. When we treat of the diseases affecting the organs of phonation in particular, we will make application of each of the varieties and alterations of the cry, which have hitherto been considered in a general manner.

ARTICLE II.—EXPRESSION OF THE FACE.

Next to the cry, the expression of the face is one of the principal means by which a child manifests the sensations it experiences. The physiognomy of a very young child does not exhibit to the eyes of people generally, a well marked expression; yet if we judge by the sentiments it inspires, we must admit that it expresses tenderness and amiability. But it is probably more correct to say, that we judge variously of the physiognomy of children, and of all other things which attract our attention in them, according to our particular dispositions; and the abstract idea we form of beauty or deformity, very materially influences our judgment. The physician should not be influenced by the sensations thus produced, for it is the result of a very superficial examination. He should attempt to understand the changes which occur, if he is desirous of discovering in the lineaments of the face, the expressions indicating the existence of any want or distress. In order to add to our knowledge of the symptoms of disease in children, M. Jadelot has proposed a *physiognomical semeiology*,

by which he has rendered a valuable service to science, since this theory is capable of shedding some light on the diagnosis of diseases of children, a subject always obscure. M. Jadelot has not as yet given publicity to this subject, otherwise than to those who have been in the habit of accompanying him in his visits; nothing therefore has been published respecting it, except by M. Eusèbe de Salle, in some preliminary remarks appended to Underwood's Treatise on diseases of children. "During the first months of life," says this author, "the face of the child scarcely presents any thing more than a shapeless mass, when but few remarkable lineaments can be distinguished. Yet acute diseases will produce evident modifications in it. These alterations will be more manifest in chronic diseases." It is from the first dentition to puberty, according to M. Eusèbe de Salle, that we may derive assistance from physiognomical semeiology.

From this it appears that M. Jadelot has not applied his new theory to diseases of children at the breast. There is therefore a deficiency to be supplied, and as we do not agree with the commentator of Underwood, in thinking that the face of young children presents no remarkable lineaments, we will endeavor to point out the changes which occur, and the indications they furnish.

In a state of quiet and health, the face of the child presents no wrinkles, the bony prominences do not appear, the cheeks are round, and there is scarcely any expression in the physiognomy; but no sooner is it under the influence of pain or of joy, than there occurs a very remarkable change in the physiognomy.

Pain, at least during the first month, is the only sensation an infant can experience, and the enjoyment resulting from the exercise of all its functions is rather the absence of pain than the existence of pleasure, such as we experience. We have seen that an infant while crying exhibits certain wrinkles at the root of the nose and at the external angles of the eyes, the mouth opens, and the muscles of the face, for the most part, are in a state of alternate contraction and relaxation. These are observed from the very moment of birth; and that particular expression which we have said results from the efforts of hurried respiration, is a first symptom, which must be observed with care, as it may lead us farther. Let us for a moment endeavor to separate the

cry which ordinarily accompanies this movement of the face, and compare the different wrinkles thus produced with those we observe in an adult suffering from great distress. The upper lip will be seen to wrinkle and elevate itself in the middle, vertical and horizontal wrinkles to be delineated at the root of the nose or to spread in front, the eyelids to approach, and a number of wrinkles to appear at the external angle of the eye, or to be delineated in a circular manner in the direction of the orbicularis-palpebrarum muscle. It is by traits such as these, that painters indicate grief, and such are the traits which are observed in an infant that cries; and finally, such are the marks which characterize pain in the child just born. If to these the physician adds other circumstances to perfect his judgment, it will be easily understood that the marks of distress may be recognized in very young children. I have convinced myself, besides, of the truth of what I have advanced by examining children that have been accidentally pricked, or that have been burned by giving them drink too hot.

It is easy to explain how the expression of distress may be exhibited by the same muscular contractions produced by the acceleration and difficulty of respiration. The painful sensations always act sympathetically on the organs of circulation and respiration, and the entire nervous circle described by Sir Charles Bell, experiences by irradiation a sudden excitement, whence results the assemblage of thoracic and facial contractions seen in a child while crying and suffering; excessive joy will likewise produce a commotion in the circulatory organs, but it suspends much sooner than it eccelerates their movements, and it is well known that excessive joy will cause syncope quicker than excessive grief. It is also well known that in a severe operation the patient does not usually faint away during the excess of pain, but that syncope generally occurs when he ceases to feel the cutting of the instrument. The cries, sobbing, and sense of suffocation, which those experience who suffer from some distress, show the connexion existing between the sentiment of grief and the convulsive agitation of the muscles of the thorax and face. In this manner can be explained why the contractions of the face which occur in crying, are the same with those that constitute the expression of grief.

This preliminary point being established, we will be able to take for an object of comparison the painful expression of face which we have just described, and to regard as a symptom of pain each modification of the physiognomy having any relation to this expression. The evidences of distress, more or less defined, can be traced in an infant in the cradle, where there exists a dull pain from chronic disease, general uneasiness, or difficult digestion: sometimes they are just visible, imparting to the face of the child a peculiar expression, which will not escape an attentive observer, difficult indeed to describe, but easily understood when seen; it is like a cloud, if I may be allowed the metaphor, covering and obscuring the face of the infant. These expressions are much more strongly marked under some circumstances, and then cannot be misunderstood. They frequently appear upon the waking of the infant, and will continue some minutes before the crying commences. In cases of continued pain, as in chronic affections of the abdomen, they are more or less perceptible or modified, they continue permanent; and if to them are added languor and depression when the skin becomes pale and shrunk, we shall have a type of the painful expression: the face then bears the seal of pain; the same occur in acute hydrocephalus and in pellicular inflammation of the air passages. We are thus made acquainted with the expression of pain in children, the first step in the study of their diseases.

In studying the particular diseases of infancy, we shall see how this expression is modified under the influence of the different organs, and we shall then apply M. Jadelot's theory as far as possible.

The face of the child may also express its feeling of joy.

Infants rarely smile before they are three weeks old. I have seen many, however, take part in the attempts often made to obtain a smile, but usually it is not until about the age of one month that an infant really begins to laugh. The expression of the face is then too well known for me to attempt its description, and all physiologists have spoken of the general unfolding of the lineaments of the face which constitutes the expression of happiness and joy, and have contrasted this condition with the state of general contraction existing in pain. "In pain," says Cabanis, "the animal retires entirely within himself, as if to present the

smallest possible surface; in pleasure, all the organs seem to unfold, as it were, to receive it in all parts."

This expression of joy in children becomes more marked in proportion as they advance in age; at first it consists in a simple movement of the lips; this movement increases, and is afterwards followed by reiterated bursts of laughter. This expression of the physiognomy is less useful for us to know, and we have been at less pains to study its modifications, our task being limited to a research for some external sign by which we may be enabled to discover the source and nature of the evils experienced by man, at an age when the language of pain can only be comprehended and interpreted with great difficulty.

To recapitulate. The physiognomy of an infant expresses—1st, Pain: exhibiting the same contractions, more or less marked, as those which accompany the cry; 2dly, Its healthy condition: no well defined contraction is then manifested; the lineaments appear to dilate and unfold.

But besides these, the face of a child may have a peculiar expression according as the encephalic, thoracic, or abdominal organs are diseased. A great number of observations will be necessary to demonstrate this fact. On this account we will not at this time point out the various expressions of the physiognomy in different diseases, but will leave them until they come properly under consideration; when it will be seen that our observations are not to be directed solely to the contraction of the lineaments of the face, but also to the shades of color, which are by no means to be neglected in the study of the diseases of infancy.

CHAPTER VII.

OF THE STATE OF THE PULSE IN CHILDREN.

ALL authors agree in the opinion that the pulse in children is much more frequent than in adults; this is true in the greatest number of cases; it is, however, subject to many exceptions, and I have often been surprised to find the pulse of a newly born child nearly as slow as that of some old men, in whom the play

of the circulatory apparatus is altered or diminished by the development of some organic lesion.

As it is important to have fixed ideas on the condition of the pulse in children, since this symptom enables us to make a proper diagnosis of their diseases, I will exhibit the result of my researches on this subject. I first directed my attention to the frequency, that is to say, to the number of pulsations in a minute, and afterwards considered it with reference to its other characters.

I will here remark that it is very difficult to count the beat of the pulse with exactness in new-born children, because the pulsations sometimes intermingle with each other, so that but one is often counted where there are two. And again, it not unfrequently happens that some beats are imperceptible under the fingers of the observer, and they thus escape his observation. Besides, it is not uncommon to find an artery vibrating twice under the finger, as occurs in the decrotic pulse of adults, by which two pulsations may be counted for one; and if to this be added the difficulty of finding the artery in the plump arm of a young infant, and the still greater difficulty of keeping the wrist fixed for any length of time, it will be easily conceived that a great degree of embarrassment always attends the counting of the pulse of a young infant. The following is the best mode of ascertaining it.

The physician ought, if possible, to avoid grasping and fixing the arm of the child with his hand, as continual motion will then be made to relieve it from the compression of the fingers; it is much better to permit the arm to remain free, and to apply the fore-finger in the track of the radial artery; it will not be discovered until after a little search; at the same time care should be taken that it be not strongly compressed, as it might thereby become flattened and its pulsation rendered imperceptible; after having felt a few beats, the pressure of the finger ought to be gradually diminished until the artery is permitted to dilate to its full volume. I have remarked that it is much easier to find the artery by applying the index finger alone, than by placing the first three fingers on the track of the artery as is recommended in adults. The finger can in the same manner be applied to the temporal artery.

Finally, if the beat of the pulse is too much hurried, too

obscure, or difficult to be accurately distinguished, the observer may be able, with the aid of the stethoscope or the hand, to count the movements of the heart, a method often employed.

The advice just given in relation to the examination of the pulse in new-born children may appear to some persons quite futile, but its importance will be better understood by those physicians who, like me, have known the difficulty experienced in obtaining any satisfactory information from the pulse of very young children. It is only with the assistance of all these precautions that I have been able to establish the following results.

In forty children, aged from one to ten days, and apparently in good health, there were eighteen where the pulse beat less than eighty; in two, it beat eighty-six; in one, eighty-nine; in four, one hundred; in ten, from one hundred and ten to one hundred and twenty-five; in one, one hundred and thirty; in two, one hundred and forty-five; in two, one hundred and fifty; in one, one hundred and eighty. Thus it appears that there were as many children in whom the pulse exhibited about the same number of beats as is usually observed in an adult, as there were of those in whom the pulse beat with much greater rapidity; and I am confident they presented no symptom of disease.

In thirty-five children, aged from one to two months, there were fourteen where the pulse never exceeded eighty to eighty-five; in one of them it was as low as sixty to sixty-two. Two had ninety pulsations; two others, ninety-four and ninety-five; five, one hundred and ten; two, one hundred and twelve; two others, one hundred and fourteen; seven, one hundred and twenty-five to one hundred and thirty; three, one hundred and forty; one, one hundred and forty-seven to one hundred and fifty. We again see here, a number of children, with pulsations corresponding in number with those of an adult; but such was not the case in the instances which follow.

In eighteen children, aged from two to three months, there were fourteen where the pulse beat more than ninety times, and in two of these it rose beyond one hundred; in two others, only seventy pulsations could be counted; and in two others, from seventy to eighty. I have not been able to ascertain the pulsations of but a small number over the age of one year, but I have almost always found them more frequent than in adults.

From the preceding details, it appears that the pulse of a very young infant is often not much more frequent than that of an adult, but that it increases in frequency in proportion as the child advances in age; whence it follows, that it is wrong to assert in a manner so exclusive and general as is usually done, that the pulse in children is more frequent than in adults. It appears to me to be clearly demonstrated that this rule has many exceptions.

The pulse of new-born children has other characteristics than those drawn from its frequency. It is very often found irregular, and, as it were, jerking, from the sudden changes experienced at the period of birth, by the circulatory apparatus, and the irregularity with which these organs at first execute their functions. It is often small, thread-like, and easily compressed. I have remarked that it is not always isochronous with the beats of the heart; or at least, on applying one hand to the heart and the other to the arm, a movement of the heart not responded to by the radial artery might be distinguished, or that the latter followed but slowly.

In treating of the particular diseases of children, I will point out the modifications which the pulse undergoes; but after the preceding remarks, we can easily understand how difficult it must be, accurately to distinguish these modifications, and to draw from them any useful inferences in symptomatology. Happily, at this day physicians attach less importance to the scholastic divisions which the celebrated Borden thought so necessary to the study of the pulse, and that they direct their attention more to those signs which are better calculated to expose the seat and nature of those alterations, which, forming in the most remote of our organs, endanger life itself.

CHAPTER VIII.

OF FEEBLENESS OF BIRTH.

CHILDREN present sometimes at their birth an intermediate state between sickness and health; this is what I term the feeble-

ness of birth. The expression is often very vaguely employed, and the apparent feebleness is not always the result of imperfect development of the fœtus, as is observed in premature children, but of more or less important alteration in some organ essential to life, an alteration commencing while the child was within the womb.

I propose to show in the course of the work, the truth of this remark, and will endeavor here to fix the proper idea which should be attached to the term, feebleness of birth.

If the external condition of new-born children be examined, those will be considered as feeble where the trunk and limbs are thin, where respiration is difficult, and where the cries are scarcely heard, and who, being unable to retain the drinks, or milk, appear always about to expire. If we trace this state of the system to its proper source, we will find the causes to be very variable, and referable to various kinds of lesions.

I will not in this place give a detailed history of all the cases in which I have found lesions of a serious character in those children that were born in the state just mentioned, but will only make a recapitulation, reserving a description of these diseases to a more suitable place for their consideration, according to the plan of this work.

In the first place, I will remark, that it is necessary to distinguish the feebleness of birth from the pulmonary or cerebral congestions often produced by some cause during labor. These accidents are recent, and the child affected exhibits, with the exception of drowsiness or syncope, all the natural vigor of health.

But it is not the same with those debilitated children whose limbs are, as it were, almost deprived of flesh, and whose bodies are covered with wrinkles, and their eyes sunk, and their general appearance of the most frightful description.

I found in eighteen children, born at the full time, and in a complete state of debility and emaciation, a very intense inflammation of the gastro-intestinal apparatus. In six others, pneumonia had evidently existed; in two, a peritoneal inflammation, characterized by adhesions already quite firm, and by the effusion of a yellowish fluid; and in one there were signs of chronic pleurisy. These facts will be subsequently referred to, with all the circumstances which render them interesting.

It is, nevertheless, far from being true, that all children born with important changes in some one of their organs, exhibit the emaciation and feebleness of which we are speaking; the contrary will hereafter be seen to be the case; and I will also here state, in anticipation, that a very serious disorganization of the cerebro-spinal apparatus often exists while the form and symmetry of the child are not in the least affected, but present the usual signs of healthy development. We also not unfrequently see children quite robust at birth, if we may judge from their good condition and the proper conformation of their limbs, expire some hours or days after birth, and presenting, on the examination of the body, a sanguineous congestion of the principal organs, such as the brain, lungs, or intestinal canal, with an effusion of blood in the cavities of these parts.

On the other hand, all children born emaciated and feeble, are not necessarily affected with serious lesions, and upon a post mortem examination they often exhibit none; of which the following is an example.

CASE I.—Marie Loisel was brought on the 5th of August, 1826, immediately after birth, to the Hospice des Enfants Trouvés. She measured thirteen inches and a half in length, the superior and inferior extremities were extremely small, the face was pinched and very red, the integuments of the ordinary color, the movements but feeble, and the cry, although perfect, was scarcely audible. The temperature of the surface was natural. She drank without vomiting, but refused the breast. In the evening, she passed a considerable quantity of meconium. She continued for some days in this state, and died on the morning of the 10th day, presenting no symptoms but those of extreme feebleness.

On examining the body twenty-four hours after death, the mouth was found healthy, the œsophagus injected, particularly at the lower part, the internal surface of which was lined with thick mucus, the liver small, and the lungs crepitant, except at the posterior part, where they were engorged. The ductus arteriosus and the foramen ovale were quite open. The brain was a little softened, and of a yellowish tint; the lateral ventricles contained a red serous effusion. In the cellular tissue of the limbs there was found a yellowish and limpid serum.

It is evident that death in this child was caused by the state of universal feebleness existing from birth; this congestion of the intestinal canal, the serous effusion in the ventricles of the brain, and infiltration of the limbs, denote, I should think, a passive and almost an inanimate condition of the principal organs, and especially of those appertaining to the circulation. We shall hereafter present other analogous facts; it is however admitted, that these conditions are rare without the existence of some other morbid cause than that of general debility of a new-born child. Children often fall into a state of marasmus after birth, which M. Gardien has described under the title of feebleness of new-born children. It will be seen hereafter, that this progressive feebleness is often produced by chronic phlegmasiæ of the digestive organs, in which the employment of stimulants and tonics, as is recommended by M. Gardien to restore the sinking powers of the child, is contra indicated. In the course of this work numerous proofs of the positions now advanced will be given.

From all these considerations, it will appear—1st, That in every instance in which an infant is born feeble, thin, and possessing but little vitality, these symptoms should not be attributed to a feeble development of its organization. 2dly, That a variety of different lesions may be the cause. 3dly, That before administering tonics and stimulants, we ought to search for the true cause of the existing debility; an examination of which can be made, if the nature, progress, and symptoms of the diseases of children at the breast be properly studied.

PART II.

DISEASES OF INFANTS.

DURING the period in which the embryo undergoes the various changes necessary to its complete development, two kinds of causes may operate to produce alterations in the form or texture of its parts. The first arises from an imperfect development of the viscera. The other, difficult to explain, but easily understood by its effects, produces alterations in the texture of the organs analogous to those occurring during life, which produce our diseases.

The first order of causes has been studied latterly with great care by the most celebrated anatomists, to whose labors we are at the present time indebted for the satisfactory explanations of the nature of some monstrosities.

As to the other alterations, it appears to me that they have not, as yet, sufficiently attracted the attention of physicians, although they are doubtless of great importance in the study of infantile diseases.

If, therefore, it is our wish to investigate the affections of the different organs of children, it will be necessary to point out the principal congenital malformations, together with the alterations of texture which each organ undergoes during intra-uterine life. It is this which I now propose to do; and also to describe the symptoms by which, at the birth, a correct diagnosis of the various alterations may be made; and considering, in their course, those diseases which are developed after birth. The therapeutic agents necessary for their relief will conclude the history of each disease.

I shall study successively the affections of the skin, cellular tissue, digestive, respiratory, circulatory, cerebro-spinal apparatuses; and lastly, the locomotive system and that of generation.

As above stated, congenital changes of the organs are divided into two kinds: malformations and alterations of texture. By congenital malformations I understand—1st, Those which result from the progress of development having been arrested, so that the affected organ exhibits nothing more than the rudiments of its primitive formation; 2dly, Those which occur from a species of hypertrophy of the organ; and 3dly, Those presenting a simple deformity in the diameter or continuity of the different parts of the body.* By alterations of texture, I mean those changes which a morbid cause produces in the color and texture of the organ, without its general form being apparently changed. I will begin with the consideration of the diseases of the external integuments, because they are the first that are submitted to the inspection of the physician.

CHAPTER I.

OF THE DISEASES OF THE SKIN.

SECTION I.

MALFORMATIONS AND CONGENITAL DISEASES OF THE SKIN.

THE embryo until the middle of the second month has no distinct skin; but about that period, according to Autenrieth, the epidermis begins to show itself. Until about four months and a half, the skin is thin, colorless, and transparent. It then assumes a rosy hue until about the eighth month; at this time it becomes paler, except in the folds. About the middle of pregnancy the sebaceous follicles appear, first in the head, and afterwards in the other parts of the body; at seven months the sebaceous or caseous envelope appears, and at birth the skin is covered with it, and is of a rosy white.†

* *Histoire générale et particulière des anomalies de l'organisation chez l'homme et les animaux*: by Isidore Geoffroy-Saint-Hilaire. Paris, 1832.

† Béchard, *Anat. Gén.* p. 291.

§ I. ABSENCE OF THE SKIN.—The skin may be deficient in one or several parts of the body, but this state almost always coexists with the absence of the parts beneath. Thus, the skin covering the abdomen, thorax, or head, is deficient when the osseous or muscular parts of these cavities are absent. When a large portion of the skin is deficient in a fœtus, the borders of the defective part are red, a little hardened, and quite adherent to the subjacent parts. In short, they exhibit all the appearance of a true disorganization.

The destruction of the skin may be produced in the embryo in two different ways during its confinement in the uterus. We often see rachitis existing in the new-born child without the skin being disorganized; but the progress of the tumor more frequently produces a thinning of the skin which covers it, followed by ulceration and rupture. Now, that which is observed after birth may exist in the uterus; and without doubt it is in this manner that the thinning or ulceration of the skin, which covers the tumor of spina bifida in some children at the period of birth, occurs either in the sacrum or spine. This destruction is evidently the result of the fluid accumulated in the tumor, causing distention and irritation in the part, augmented by the frictions to which a projecting part is exposed.

Again, the disorganization of the integuments of the fœtus may be produced in the following manner: the uterus may contain in its cavity some morbid production which alters its form and capacity, and that part of the integuments of the fœtus which is in contact with the projecting part of the uterus may become thin and even disorganized, and the child at birth exhibit evident traces of this compression and disorganization of the skin.

I found in a child recently born, the history of whose case is reported in the chapter on hernia of the cerebrum, a destruction of the skin over the left parietal bone. It was replaced by a vermillion-colored cicatrix, depressed and smooth, an inch and a half in length, and four lines in breadth. The parietal bone, which was depressed in this place, exhibited also an oblong opening scarcely an inch long, the circumference of which was irregularly round.

From the deformity of the head, the depression in one part of the cranium, and the complete destruction of the scalp, to-

gether with the wearing away of the parietal bones at the place of depression, I inferred that there had existed in the womb a projection, such as a polypus for instance, which, coming in contact with the portion of the cranium just described, destroyed its integuments; or that a malformation of the pelvis had restrained the development of the uterus. It is to be regretted that the form of the womb in the mother of this child could not have been ascertained, and that it could not be known whether during her pregnancy she had received a blow upon the abdomen. Be this as it may, these conjectures are supported by a fact sufficiently evident to render them at least probable. On this subject, Hippocrates has expressed an opinion in his treatise on generation which is worthy of notice. He not only thinks that if during pregnancy the mother receives a blow on the abdomen the infant will be injured in a part corresponding to the place on which the blow had been received, but adds besides:—"Quin et aliâ hujusce modi causâ mutilantur pueri; quum uteri locus quâ parte mutilati sunt, angustior fuerit; necesse est corpus quod angusto in loco movetur, illic mutilum fieri."—(*De Geniturâ*, cap. vi.) The preceding observation corresponds remarkably with this idea of the father of medicine. The case published by Lesage (*Bulletin de la fac*, 1805) is likewise an instance in point; that of a fœtus bearing on the forehead the traces of a lesion which appeared to have been produced by a blow given to the mother on the abdomen. Professor Chaussier also has observed some analogous facts.*

Therefore, the skin of a fœtus in the uterus may be destroyed to a greater or less extent, whether this effect be produced by a tumor developed on the surface of the body of the child, thus exposing the skin to a considerable distension, producing thereby a thinning and ulceration; or whether there had existed in the womb a hardened and projecting part, against which, notwithstanding the protecting influence of the liquor amnii, a portion of the fœtus had pressed.†

* See also an instance related by M. Geoffroy-Saint-Hilaire, in which a child had been injured in the third month, and became in consequence a monster. (*Mém. de la Soc. médicale de l'emulation*. Tome ix. Paris, 1826.) See Appendix.

† There may exist also another cause of inflammation and ulceration of the skin of a fœtus before birth. It is well known that the absence of contact of the atmo-

When a child exhibits at birth this want of integuments, it will be necessary to apply a bandage capable of protecting and sustaining the organs deprived of their natural coverings, and at the same time promoting the cicatrization of the ulcerated part.

§ II. CUTANEOUS EXCRESCENCES.—The skin may exhibit malformations by superfluous growth. Congenital cutaneous excrescences almost always result from a fold or elongation of the skin, developed in various parts of the body. These cutaneous prolongations may be observed on the face, body, or limbs. They are more commonly seen on the face, hands, and feet; and are sometimes of so great a length as to produce a true deformity. Meckel remarks that they are generally accompanied with a defective development in the tegumentary membrane at other points. I saw at the Hospice des Enfants Trouvés, a female in-

sphere on the skin, contributes in certain cases to produce a local transformation of the skin, imparting to it the peculiar properties of a mucous membrane. This is observed in the deep folds produced by the flexion of the limbs of fat children, and it also follows long standing muscular contractions. Hébréard has long since cited facts of this kind to demonstrate the analogy between the skin and mucous membrane. (*Mém. de la Soc. Méd. d'emulation*. Tome viii.) There is no doubt that the liquor amnii has an influence on the surface of the body of a fœtus in the uterus, analogous to that of the air upon the body of a child after birth, as is evident when, from the peculiar position of the limbs of the fœtus, they are withdrawn from the action of the fluid. The skin at first softens, then inflames, and finally ulcerates. The following case reported by Dr. Ollivier, of Angers, presents a remarkable instance of an affection of the skin from this cause.

On the 24th of April, 1828, a female infant two days old, was brought to him, exhibiting a rare variety of club foot; the two feet were turned over on the legs, so that the dorsal surface of each foot was in direct contact with the anterior part of the leg. On the left side, above the external malleolus, in the folds resulting from this forced flexion of the foot on the leg, there existed two ulcerations in the skin, of a grayish color at the bottom, very red and bloody at the borders, having the appearance of a recent burn of the second degree. The right foot at its internal part, and on its entire dorsal surface, together with the lower third of the anterior face of the corresponding limb, exhibited a large eschar of a grayish yellow, surrounded by an inflammatory, red, and bloody circle. This ulceration also resembled a recent burn. The accoucheur having noticed this singular alteration in the skin, at the time of the birth of the child, applied over it compresses wetted with a decoction of marshmallows, without its producing any alteration in the ulcer.

Dr. Ollivier, after ascertaining that a moderate degree of extension easily restored the two feet to their natural situation, advised the application of an extensory bandage to oppose the unnatural flexion, at the same time applying Goulard's cerate to the ulcerated surfaces. This treatment, pursued with care, was followed by a complete cicatrization of the two ulcers, and shortly by a restoration of the feet to their proper position.

fant, who had upon each cheek a cutaneous excrescence about half an inch long, and of the thickness of a crow-quill. There were also two others on the same child, of the same thickness, but much less prominent, before each ear. The concha of the left ear scarcely existed, and there was a complete closure of its opening. As to other parts, the child was perfect in every respect, and enjoyed good health; after a few days, she returned to her parents, who had only temporarily placed her in the hospital.

These cutaneous excrescences ought to be removed within a few days after birth, as the cicatrix resulting from their excision will be less apparent, and will after a while be gradually effaced. The best method of removing them, I think, is by ligature, which should be applied at their point of insertion.

We must not confound these excrescences with tumors arising from fungus hæmatodes, a disease which we shall consider hereafter.

Authors have described excrescences formed on the skin, of a horny nature. This production has often been observed in adults and old people; but it is, I believe, extremely rare to meet with them among children, and particularly in new-born infants. I therefore point out this alteration of the integuments, as one of possible occurrence. These pathological productions should, in all cases, be promptly removed, together with a portion of the skin to which they are attached.

Children have been sometimes seen covered with hair. Haller observes that there were such cases, which induced ignorant people to regard them as bears or goats.*

We can easily account for this anomaly. The skin about the middle of the intra-uterine life is covered with a quantity of hair, which, for the most part, falls off sometime before birth. These are the hairs which are found in the water of the amnios, and sometimes in the meconium of the fœtus. But if it happens that this hair, instead of falling off, undergoes a considerable development and remains on the skin after birth, the child exhibits the appearance of which Haller speaks; the body, face, and limbs are covered with it, but instead of presenting an inexplicable phenomenon, it is simply an amplification of a normal develop-

* *Opera Minora, de monstribus, liber i.* Valsneri has also reported examples of the same kind.

ment—an irregularity of the general laws which govern the growth of the embryo, and one of the number of the series of aberrations which are constantly observed while studying human organization.

We ought in this case to avoid the use of any topical application to the skin, for the purpose of destroying these hairs, as it is thereby exposed to irritation, and the health of the child endangered. They will fall off altogether, or in part, without any remedy, and the surface of the body will soon lose the repulsive aspect produced by this abnormal growth.

The hair of the head may be more or less abundant, but its development presents nothing worthy of remark.

Hair is sometimes to be observed in deep-seated or subcutaneous tumors, a condition very difficult to account for, and which also exists as frequently in adults as in infants.

The nails vary but little with respect to their structure; neither do they offer any thing remarkable as to the place of their growth. The only thing worthy of notice, is their presence in the midst of steatomatous matter enclosed in cysts.

Accidental horny productions are more often to be seen in old people; they are very rare in infants, and it is only to persons advanced in age, that the following passage from Haller is applicable:—

“Cornua etiam huc referas alieno loco in animalibus femellis reperta quorum soli mares ex naturæ ordine cornuti sunt; aut in aliis animalibus speciebus ne mares quidem cornua gestant ut in lepore, catello, sue, et demum in hominibus effloruerunt.”*

If horny excrescences be observed in a new-born child, they should immediately be removed, at least if the actual condition of the child should not forbid the early operation.

§ III. ALTERATIONS OF COLOR.—Alterations in the color of the integuments are not less remarkable than their malformations. Haller reports examples of black children having been born of white parents, and white children of negro parents. He also says that there have been seen spotted infants. Formerly these anomalies were considered as the effect of the capricious sportings of nature, by which she would sometimes disfigure her fair productions; but at the present day we ought rather to seek

* *Demonstris*, lib. i., hist. cap. iii., p. 5.

for their causes, which our knowledge of the growth of the fœtus enables us in some measure to accomplish.

The skin does not at first exhibit its different component parts. A simple, thin, and transparent pellicle, it may be said to be primarily a continuation of the amniotic membrane with which the umbilical cord is covered; the line of demarcation at the point of the insertion of the cord cannot be distinguished. It remains thin and colorless for four or five months, when it greatly augments in consistence and thickness; blood abounds in the *rete mucosum*, and the skin of the fœtus assumes a clear, rosy hue. Thus it is to the afflux of blood to the skin that this part owes its color; and to the various modifications which the blood undergoes, must the coloring of the skin be attributed, as it appears in the shades of hue in the different races of men.

But if from some cause which we may not be fully able to explain, it should happen that the blood in circulating towards the integuments undergoes a change in its composition or in its course, then these will account for the variety of color and altered appearance of the integuments observed by anatomists in certain infants. In order to examine this proposition, let us consider, in the first place, what are the alterations in color which the blood in general undergoes in the tissues.

1st. It sometimes happens that the blood is suddenly interrupted in its course, and flowing from its natural passages, extravasates, and diffuses itself beneath the surface and in various other parts of the body, as has been observed by Whenloff, Stall, and a number of other authors, constituting what is called petechiæ or spotted diseases.

2dly. The blood, either by yielding to the force of gravity, or in consequence of being concentrated by the stimulus of inflammation, accumulates in a particular part, and acquires a violet, brownish, and lastly a black color. This is to be observed on the surface of the lungs and in the intestinal canal, and to this cause may also be assigned the black lines and spots seen on the surface of mucous membranes.

3dly. The blood may not furnish the coloring principle to the skin, either because this principle is wanting in some individuals, or because the fine net-work of the skin is not in a condition to receive it; the integuments and the hair, for these reasons, will

maintain the same destitution of color which they possessed at an early period of the foetal life, presenting the appearances which are seen in albinos.*

From these considerations, it is possible that children who are said to have been born spotted, black, or white, are so during their intra-uterine life; that the blood that is extravasated to form the spots or petechiæ has not imparted to the integuments its usual coloring material, which produces albinos, or finally, has experienced a change in color, causing the brown or black appearance of the integuments, as has recently been observed in an adult at "la Charité" hospital.

However, there should not be much importance attached to these peculiar colors of certain infants; yet we ought to examine them with some care, before pronouncing them to be congenital. Doctor Launay, chief assistant surgeon to the military school at Saint Cyr, sent me in the year 1826, an embryo, about two months old, the entire surface of the body of which was black. He obtained it from a person ignorant of anatomy, who had preserved it for twenty years in alcohol, under the idea that it was a negro. In order to give more weight to this notion, on which account alone it was interesting to him, he said that the embryo had, at a former period, been brought from foreign parts.

But considering, in the first place, that the offspring of negroes are not born black, and being desirous of aiding my judgment in this case by anatomy, I dissected with great care the different organs of this embryo, all of which I found black, like the surface, and in an evident state of decomposition. Thus, then, the black coloring of this subject was owing to a true decomposition, the progress of which had been arrested or suspended by its immersion in alcohol, after this change of color had commenced. The imaginary history of this foetus might easily have been credited, without an attentive examination of its actual condition.

§ IV. SPOTS, OR NŒVI MATERNI.—Spots on the skin, form a transition between the malformations and the inflammatory condition of the integuments.

The origin and cause of these spots are very obscure. For

* *Réflexions sur la leucopathie, considérée comme le résultat d'un retard de développement*: by Doct. Mansfelt, of Brunswick. *Journ. Complémentaire du Dictionnaire des sciences médicales*. Tom. 25. p. 43. Année 1826.

a long time, the spots of birth have been considered as the effect of the imagination of the mother, who had, during her pregnancy, been alarmed at the sight of an animal, or whose mind had been affected with some whimsical desire. According to this idea, physicians have designated them by the fanciful names of *nævus maternus*, *muttermahl*, *mother spots*, of the inaccuracy and inutility of which, we are fully sensible at the present day.

They are usually marks of varying sizes, irregular in form, and more or less projecting; appearing in every part of the integuments, and generally of a clouded yellow, brown, rose, red, livid, blue, or black, corresponding in this respect with the appearances often seen either on the surface of the body, or in deep seated organs which have become the seat of pathological alterations.

The cause of these spots we might, therefore, suppose to be an alteration in the cutaneous pigment, which, as has been demonstrated by Blainville, is immediately dependent on the capillary circulation. They are then the effect of disease in the *corpus mucosum*, in which the capillary vessels deposit the pigment, or in the net-work of the vessels themselves; hence the distinction established by the researches of Callisen, Bateman, Abernethy, John Bell, and Wardrop, between the pigmentary and vascular spots; a distinction maintained also by Rozen, in his excellent treatise on diseases of the skin.

If the congenital spots are the result only of an alteration in the cutaneous pigment, we should never meet with them on the surface of the body of an embryo before the third month, since the pigment does not exist at this period, and it is not until about the middle of the term of gestation, that the skin of the fœtus receives a large supply of blood, and acquires any high degree of organization. I have examined about twenty embryos before their arrival at the age just mentioned, and in none of them did I observe these spots; this, however, is not a sufficient proof to support my opinion; it will only add to the number of facts of the same kind already existing.

The skin, although composed of parts sufficiently distinct to enable the anatomist to study them separately, really forms but one organ, the different parts of which have so intimate a connexion, that it is easy to conceive how a disease of one may involve the others: the hairs and the bulbs of the skin, for in-

stance, may be inordinately developed in connexion with the cutaneous vessels, producing brown and red spots, covered with colored hair more or less prominent, on the surface of certain parts of the body. It is also possible that the vascular net-work and papillæ of the skin may undergo an alteration independently of the pilous system; and spots, remarkable for their prominence, of a brown or violet color, and sometimes their rugous aspect, are often seen without any hairs upon them. Finally, a simple alteration in the natural color of the pigment without apparent tumefaction may occur, exhibiting those yellow, red, violet, and other colored spots, so common on the face, trunk, and limbs. These last are properly called spots, for those which are prominent, and covered with hair, suppose an alteration in some one of the other parts which constitute the skin.

The yellow, brown, or red spots which we have just been considering, remain stationary after birth, denoting that there exists no morbid action in them, nor any tendency to disorganization; but they present nothing more than a simple change in the cutaneous pigment, and are, in reality, a peculiar property of the skin: they may continue as long as the part itself remains, and their removal by caustic or a cutting instrument, ought seldom to be attempted, as scars will be left, much more disagreeable to the sight than the spots themselves.

But these remarks are not applicable to those red vascular tumors which exist on young infants. Sometimes they are of an oval shape, and pediculated, consisting of a true erectile tissue, of a bright red color, with a granulated surface; they are on this account compared to cherries, raspberries, or strawberries; comparisons which make a strong impression on the minds of the generality of people, as they accord with their preconceived notions. At other times, they are less regular in their shape, and are situated more deeply under the skin, consisting of tumors with large bases, and presenting a surface crossed by aneurismatic vessels; the presence of which enables us to ascertain their cause and formation. These are the tumors described by J. L. Petit, under the name of varicose wens, known also by the name of sanguineous fungi, aneurisms of the small arteries, etc. They differ from aneurisms by anastomosis, in the want of communication between the arteries and veins, and in the absence of

pulsation, and the murmur peculiar to these aneurisms. In both cases, the cutaneous projections produced and maintained by the aneurismatic dilatation of the small subcutaneous vessels, are very much disposed to enlarge and ulcerate after birth, terminating in fatal hemorrhages; so soon, therefore, as the age and health of the child will permit, their growth should be checked, or they ought to be effectually removed.

Different methods have been proposed to accomplish this object. Abernethy has recommended refrigerants and compression.* Professor Boyer has removed a *nævus* on the upper lip by pressure, continued seven hours a day with the finger, using at the same time a solution of alum;† but Bateman has remarked, that compression is sometimes difficult to make, is painful, and often ineffectual; I think it would be well to try it on parts easily compressed, and to discontinue the pressure when any unfavorable symptom is produced.

Fabricius de Hilden, J. L. Petit, and John Bell, recommend the extirpation of the tumor by the knife, taking the precaution of removing with it a portion of the adjoining parts. This method appears to me much better than the use of caustic, the action of which is sometimes difficult to control; it should be used after compression has been tried and found to be ineffectual, or when this is impracticable.

Wardrop, one of the most celebrated surgeons of London, has advised the tying of the main artery supplying the tumor, and afterwards the extirpation of the diseased part; it succeeded perfectly in his hands.‡ Perhaps, without extirpating the tumor, compression alone, after tying the artery, might be sufficient to produce its absorption.

Lawrence published an essay on this subject in 1826, in which he proposes to pass a needle, armed with a double ligature, through the base of the tumor and tie it on both sides, thus circumscribing the base, which being gradually compressed, produces a shrinking, and finally a complete destruction of the fungous tumor. Several cases treated in this manner, are reported by him.§

* *Traité des Malad. Chirurg.*

† *Surgical Works*, vol. 2.

‡ *Med. Chir. trans.* v. 9.

§ 30th vol. of the *Medico-Chirurgical transactions*.

None of these methods of removal, however, need be resorted to immediately after birth, for it is possible that the tumor may remain stationary until puberty ; but they ought not to be delayed after the first symptoms of increase, or of disorganization appear ; the ulterior progress of the affection may hasten the death of the patient, or may render the operation more difficult or dangerous.

SECTION II.

DISEASES OF THE SKIN NOT INFLAMMATORY, DEVELOPED DURING BIRTH, OR OCCURRING SUBSEQUENTLY TO THIS PERIOD.

I propose to treat under this head of local or general congestion, of petechiæ, and of some alterations of color.

§ I. Ecchymoses observed upon different parts of the body of a new-born infant, are, as is well known, generally the result of difficult labor. They are particularly to be remarked in those parts which have been strongly compressed in the straits of the pelvis : this is the ordinary cause of the ecchymosis of the scalp. It may be well to observe, however, that this ecchymosis is not always the result of pressure which the head undergoes in passing the pelvis. In the month of May, 1827, I delivered a woman at the "Maison Royale de Santé" of a fœtus about four or five months old ; she told me she had experienced much pain for about fifteen days, and for eight days had lost so large a quantity of blood as to give her reason to apprehend an abortion. The membranes of this fœtus were entire ; the clearness of the liquor amnii enabled me to see the fœtus, the head of which was downward and the feet elevated. On the summit of the head appeared a large ecchymosis surrounded by a number of small vessels ramifying beautifully over the scalp.

This child had no doubt been dead for some days, and from the time of its death, being entirely free in the waters, the fluids had submitted to the laws of gravity ; and this ecchymosis of the skin of the cranium must be regarded, not as the effect of compression, but as the result of the position of this part since the death of the embryo.

It is not always so ; for in an infant born at the full time, by either of the first positions, it is evident that the cause of the

ecchymosis is both the position and the compression of the ecchymosed part.

In most cases, the resolution of these tumors is effected spontaneously. If, however, they should be accompanied by much tumefaction of the integuments, the application of topical discutients, such as a solution of the muriate of soda, acetate of lead, or muriate of ammonia, will hasten their removal. But it is seldom necessary to have recourse to these remedies, for generally the ecchymosis and tumefaction disappear of themselves. I have made a number of anatomical examinations upon the condition in which the integuments of the cranium are found when thus ecchymosed, and upon the period at which the ecchymosis usually disappears. The following are the results of these researches.

§ II. TUMOR OF THE SCALP.—The tumor of the scalp, as Capuron remarks, may arise from two causes; it is either the result of an œdema, a serous infiltration, or of the accumulation of blood.

In the former case the tumor is never well circumscribed; it scarcely rises in the form of a cone, but consists of a general engorgement of the integuments of the cranium. It then quickly disappears.

In the latter case the blood is infiltrated either in the cellular tissue, or in the ultimate vascular ramifications; blood flows from all the incisions made in the scalp, which is black or mottled. It is not uncommon to find drops of blood interspersed in the adipose matter; at other times there exists an effusion of blood between the skin and pericranium, produced by exhalation, or by a rupture of the small blood vessels. The blood is then very black and fluid, and is contained in a sort of sac caused by the separation of the scalp; all the surrounding parts are tintured with a violet red, even the bones partake of this color, resulting evidently from the absorption of this fluid. I once saw in a child, three days old, a sanguineous effusion of this species so extensive as to produce an entire separation of the skin of the cranium. This child died of pneumonia, and so universal was the effusion of blood on the exterior of the cranium, as to produce what may be termed a *tegumentary apoplexy*. The proper course of treatment in these cases, I think, would be to make a longitudinal incision at the summit of these sanguineous tumors, after discutient remedies have failed.

The period of the disappearance of the ecchymosis and tumors of the scalp, is very variable. I have known children to retain the traces of them at the age of fifteen or twenty days, whilst, in the greatest number of instances, they usually disappear at the age of eight days. It depends on the extent of the ecchymosis and the quantity of blood effused.*

We should avoid, as Capuron judiciously remarks, confounding these tumors with encephalocele, as the error might be fatal, in mistaking the latter disease for a sanguineous tumor; the distinctive characters of the two affections will be pointed out when treating of cerebral hernia.

Other ecchymoses may often be seen on various parts of the bodies of infants recently born. They are always found on parts that have been rubbed or compressed; they soon disappear like those of the head, undergoing a change in their color, to violet, blackish, or yellow, like ecchymoses in adults.

§ III. CONTUSIONS.—When the use of the fillet, forceps, lever, or chrochet, has been found necessary to terminate labor, the child often exhibits contusions in different parts of the body, which demand the attention of the physician, for they may give rise to erysipelatous inflammation, the progress and complications of which, endanger the life of the child. Happily, these

* I do not here allude to the sanguineous effusions described in the latter part of the last century, and also quite recently, under the names of *abscessus capitis sanguineus neonatorum*, *Hæmatoma*, *Hæmatoma capitis*, *cephalæmatoma neonatorum*, *Ecchymoma capitis*, *Tumor cranii sanguineus*, by Levret, Smellie, J. F. Frank, Paletta, Nagele, and other authors. In this kind of tumor, the blood is not simply effused beneath the skin, but rather between the pericranium and the bones; according to the observation of a number of authors, this effusion results from the rupture of the veins near the junction with the sinuses; according to others, it occurs in the diploe and depends on a primary alteration of the bone, which often involves the destruction of its external table. It should be added, that this kind of sanguineous tumor does not arise from long and difficult labors, since all authors agree that it is observed when the passage of the child has been quick and easy.

Paletta, *Excercitat. pathol.* Milan, 1820. Car. Zeller, *De cephalæmatomate, seu sanguineo cranii tumore recens natorum.* Hiedleberg, 1822. Ant. Herr. Haller, *De tumore capitis sanguineo neonatorum, dissert.* Dorpat, 1824. G. C. L. Brandau, *Eccymomata capitis recens natorum.* Morbourg, 1824. G. Fr. Hære, *De tumore cranii recens natorum sanguineo, et externo, et interno.* Berlin, 1824. This author admits a species of sanguineous tumor, in which the blood is between the pericranium and dura mater. J. D. Strewé, *De cephalæmatomate, seu sanguineo cranii tumore externo recens natorum.* Giessen, 1828.

accidents are less to be feared at the present day, when the obstetric art is reduced almost to the study and direction of the progress of a function, which, however difficult or complicated it may sometimes be, is not less natural than those to which our bodies are daily subjected during the continuance of life. The general congestion of the skin of the fœtus being ordinarily connected with some affection of the respiratory apparatus, I will reserve the consideration of this subject until the diseases of those organs are noticed.

§ IV. PETECHIÆ.—The hemorrhagic spotted disease, which Rivière,* Werlhof,† Bateman, and other authors, have described under different names, and the history of which has been so well exhibited under the title of Hemacelinose, in the work of M. Rayer,‡ are seen in feeble and badly nourished children, where the capillary circulation is found, from some cause difficult to ascertain, quite deranged, and disordered in such a manner as to give rise to effusions of blood on the surface of the body. The skin then presents a greater or less number of small spots or petechiæ, of a violet color, and almost always of a round shape.

This disease is ordinarily apyretic, particularly in children. It may be simple, that is to say, unaccompanied with any general or particular symptoms during its commencement, development, or termination; or it may be complicated with symptoms of a nature more or less serious, such as hemorrhages from the gums, stomach, intestines, or bladder, or even with inflammation of these organs.

I saw this petechial disease in two young infants, who exhibited a condition of debility and prostration in a very marked manner; one of them, eight days old, revived after the disappearance of the petechiæ, which faded, by degrees, assuming successively a kind of black, livid, and finally a yellow color; the other, younger, more feeble, and possessing less vivacity, quickly succumbed. The following, is the examination of the case.

CASE II.—Delarue, a female child, was deposited at the Foundling Hospital, on the 27th of March, 1829. A billet fastened to the

* *Praxis med.* Lib. 17.

† *Opera med.* See note 65, chap. iii., *De variolis et anthracibus.*

‡ *Traité théorique et pratique des maladies de la peau, fondé sur de nouvelles recherches d'anatomie et de physiologie pathologique.* Paris, 1827. 2 vol. avec planches coloriées.

arm, indicated her age to be three days; she was strong, and large; color slightly jaundiced, respiration but little developed; the cry scarcely heard; the inferior extremities were œdematous. The face, trunk, arms, and legs, were covered with violet-colored petechiæ of various sizes, from that of a point to a lentil. The unequal manner in which they were disseminated, and the intervals of yellow between them, gave to the body the appearance of a tiger's skin. She remained in this state for two days, drinking a few drops of milk, crying with difficulty, and respiring but little. She died on the evening of the 29th of March. The examination of the body was made on the succeeding day.

Digestive apparatus.—The stomach was filled with a considerable quantity of black, viscid blood; its internal surface, together with that of the jejunum, was filled with a number of petechiæ like those on the exterior of the body. Effusions of blood were found in different parts of the interior surface of the intestinal canal, the mucous membrane exhibited at the parts corresponding with these effusions, petechial ecchymoses resembling those of the stomach; the termination of the ileon contained blood rather more black, and more fluent; the large intestines presented a well-defined follicular eruption; and at their termination, there was a considerable quantity of blood; the walls were thick and firm.

The spleen was very large, and very much engorged with blood; it presented, near the entrance of the small vessels, an oblong superficial rupture, on the surface of which, there adhered a little solid clot of blood. In the cavity of the abdomen, was found a large table-spoonful of blood, effused probably by the rupture of the spleen.

The heart was very large, and engorged with blood, and the surface covered with petechiæ; a yellow serum was contained in the pericardium; the pleura was spread over with petechial spots. The usual fetal openings still continued unclosed; the lungs were engorged, the kidneys and the bladder had on them likewise a number of ecchymosed spots. The cerebrum was very highly congested.

The cellular tissue of the limbs and the integuments of the abdomen, presented large ecchymoses, and blood was infiltrated throughout the tissue.

The condition of this child was analogous to those which Werlhof has noticed in adults, and of which I also have given examples in another work.* These different sanguineous effu-

* *De la membr. muq. gastro-intest.* Paris, 1825.

sions are doubtless the effect of the plethoric state in which this child was born, and particularly of the congested condition of the circulatory and respiratory apparatus. The coincidence of the sanguineous exhalation on both the external and internal surfaces, is worthy of notice.

For the treatment of this disease, acidulated and diluent drinks are usually advised. In children who exhibit, like the one whose case has just been described, a well marked sanguineous congestion, the best application, without doubt, would be a few leeches to the arms, to diminish the quantity of blood in the seat of the disease. When hemacelinosis is simple, it had better be left to nature.

I once saw upon the inferior extremities of a child aged eight months, much emaciated and affected with a chronic inflammation of the mesenteric glands, several ecchymosed spots of a violet color, developed spontaneously, analogous to marks of a scorbutic character, which appear on the limbs of old people reduced by age and suffering.

Of some alterations of the color of the skin.—Alterations of the color of the skin, are usually the effects of age or of disease. They are rarely to be seen on sucking infants; still there may occur at this tender age, the different varieties of lentigo, ephelides, etc.; but as these various alterations of color are common to all ages, I must refer to the works of Franck, Lorry, Bateman, Alibert, and Rayer.

SECTION III.

INFLAMMATIONS OF THE SKIN.

Some are developed in the uterus, and the child is born with them; and others do not occur until after birth.

Congenital inflammations of the skin.—Physicians have, for a long time, described different eruptions that appear on the body of a new-born child. Almost all are regarded as syphilitic, although often they are not so; and it is in works that treat particularly of venereal diseases, that we find examples of congenital cutaneous inflammations: accoucheurs also have mentioned them. Infants have sometimes been born with measles; Vogel, says Rayer, asserts that he has seen children born with the

traces of measles upon them. Dugès has reported, in his Inaugural Dissertation, several cases of cutaneous phlegmasiæ on the bodies of infants at the Hospice de la Maternité. I have seen in a young infant, an erythema under the form of small irregular patches, disseminated upon different parts of the body, the appearance of which resembled much that of measles. Small-pox has been developed while the child was within the uterus.* Jenner has recorded in the first volume of *Medico-Chirurgical Transactions*, a case of congenital variola, occurring in an infant born on the 11th of June, 1808, whose mother had been vaccinated on the 6th of May. The body of this child was covered with the beginning of the eruption. New variolous pustules appeared the day after birth, and the child died on the eighth day in convulsions.

I saw at London, in the Anatomical Museum of Astley Cooper, at Guy's Hospital, a fœtus preserved in alcohol, the body of which was covered with well-marked variolous pustules. Dr. Hodgkin, conservator of the Museum, communicated to me some very interesting facts in relation to this case, of the authenticity of which I was well assured, as they were duly recorded in the register containing the history of the principal articles contained in this Museum; these details were furnished, together with the preparation, by Dr. Jos. Laird.

CASE III.—Hannah Howard, aged 26 years, was attacked with the small-pox, while pregnant with her second child, about the middle of the fifth month. She became sick on the 28th of August, 1805, and the eruption appeared on the 30th. She entered the general dispensary, in Aldergate-street, on the 2d of September. The pustules were confluent, and formed, as we may say, but one crust on the face and arms. They were distinct upon the trunk and inferior extremities, where they appeared projecting and surrounded by a red circle. The symptoms were those which usually accompany small-pox. The bowels were maintained in a soluble condition, opiates were administered, and cold and acidulated drinks freely given. In ten days after the desquamation, she was convalescent; was able to walk about, and felt the movement of the child three or four times; but since

* Moriceau, Watson, and Sydenham have given examples of this; they have seen children covered with variolous eruptions born of healthy mothers.

that time she experienced no motion, and on the 28th of September, was delivered of a foetus, which, from its size and form, appeared to be about six months old. It had been dead probably for some time, for the skin of the abdomen and hands was raised, and it presented some evidences of putrefaction. On the back and shoulders, and more particularly on the superior part of the thighs, where the integuments were in a good state of preservation, there were several very distinct pustules, characterized by their round borders, slightly projecting, and their depressed centre; the placenta was not examined.

This case appears to me interesting in two respects: it proves, in the first place, the communication of diseases from the mother to the child; and, in the second place, the possibility of the development of diseases during the intra-uterine life, analogous to those with which adults, or children after birth, are attacked.*

I do not intend to enumerate here all the congenital cutaneous diseases noticed by authors, and will conclude by referring to a curious case of pemphigus, observed by M. Lobstein, of Strasbourg,† and which M. Dugès erroneously considered as a syphilitic affection.‡

I shall give below the characters of cutaneous diseases; it will be easy after that to arrange those of infants in the classes, genera, and species in which they belong, and thus to devote more attention to them.

SECTION IV.

INFLAMMATIONS DEVELOPED AFTER BIRTH.

Authors, in general, have not sufficiently urged the consideration of the cutaneous phlegmasiæ of new-born and sucking children. Still they are numerous; and as it is important to be well acquainted with them, that they may not be confounded with congenital syphilis, which often shows itself in this form, I have thought it incumbent on me to trace their history with pe-

* Analogous cases are to be found in Bartholin, (*Epist. med.* cent 2, p. 682,) and in *Philos. trans. abridged*, v. 3, p. 308. Boerhaave, also, speaks of having seen a similar case. Van Swieten, *Variolæ*. See appendix.

† *Journal complémentaire du Dict. des Sciences méd.* Tom. 6, p. 3.

‡ *Maladies les plus importantes et les moins connues des nouveau nés.* Dissertation inaugurale. Paris, 1821.

culiar care. In order to facilitate the diagnosis, I have followed a particular method, of which I shall now proceed to give some idea.

Considering the great number of classes, genera, and species, according to which modern authors, more especially Willan and Bateman, have arranged cutaneous phlegmasiæ, I have thought that the method proposed by M. Lamarck for the examination of the classes, genera, and families of plants, might be advantageously applied to the study of the subject before us. It is well known that this celebrated naturalist has placed all the known plants in successive divisions, exposed in such a manner as to leave always a choice between two contrary propositions, so that the observer selects one of the two propositions agreeing best with the subject under examination; he then finds one for reference, which conducts him to propositions or descriptions successively and constantly opposed, finally arriving at that which gives him the most exact description of the object of his search, and enables him in this manner to assign to it the class, genus, and species, to which it belongs.

My object is to follow nearly the same course in the exposition of the diseases of the skin; and, in order to accomplish it, I will trace in the synoptical tables the opposing characters of the classes, genera, and species of inflammations of the skin, arranged according to the classification of Willan and Bateman, modified by the more recent work of MM. Bielt and Rayer. The reader finding himself conducted by the signs or numbers, to the successive tables, will gradually arrive at the characters of the class, genus, and species of the disease of which he is in search.

With Rayer, I denominate inflammation of the skin all diseases characterized, at their commencement, by an accumulation of blood in one part or in the whole of the surface of this membrane; an alteration followed by a complete resolution, desquamation, morbid secretion, ulceration, induration, or other changes in the organization of the part affected.

TABLE FIRST—CLASSES.

INFLAMMATIONS.

1. Redness, more or less vivid, resulting from a morbid accumulation of blood in the integuments, to a greater or less extent, with or without tumefaction; without pimples, usually disappearing under the pressure of the finger, and reappearing when the pressure is removed.

EXANTHEMATOUS INFLAMMATIONS.

See A. Table 2d.

3. Transparent vesicles forming small serous elevations less voluminous than bullæ, resulting from a drop of serum effused between the epidermis and the corpus reticulare; on being ruptured, the contents flow out, accompanied or followed by superficial excoriations of thin and lamellated crusts.

VESICULAR INFLAMMATIONS.

See C. Table 2d.

5. Elevations small, *firm*, *round*, *color corresponding with that of the skin*, accompanied by itching, more or less severe,

2. Redness, more or less vivid, of variable extent, preceded or accompanied by small tumors, formed by an accumulation of serum or of sero-purulent matter accumulated between the epidermis and the inflamed corpus reticulare.

BULLOUS INFLAMMATIONS.

See B. Table 2d.

4. Elevations from one line to three lines in diameter, usually circumscribed and not transparent, often surrounded by an inflamed areola, and formed by pus deposited between the epidermis and the corpus reticulare. They terminate by desiccation, ulceration, and induration.

PUSTULAR INFLAMMATION.

See D. Table 2d.

6. Elevations or tumors solid, *resisting*, *circumscribed*, *indurated*, *lasting*, more voluminous than papulæ, and almost always

ordinarily terminating in resolution and furfuraceous desquamation, and sometimes in small ulcerations.

PAPULAR INFLAMMATIONS.

See E. Table 2d.

7. Elevations and red spots largely prominent, little hardness to the touch, continually covered with scales of the altered epidermis, which are constantly detached from the surface of the skin.

SQUAMOUS INFLAMMATIONS.

See G. Table 2d.

9. Redness circumscribed, painful to the touch, accompanied by a base, and soon by a puffiness of the subcutaneous cellular tissue, usually terminating in suppuration.

FURUNCULOUS INFLAMMATIONS.

See I. Table 2d.

11. Redness and alteration of the tissue more or less analogous to the general characters of other species of inflammations, and presenting in their phases much more variety of form and aspect. These are usually caused by excess of cold or of heat.

INFLAMMATION FROM COMBUSTION OR CONGELATION.

See K. Table 2d.

terminating in suppuration or ulceration.

TUBERCULAR INFLAMMATIONS.

See F. Table 2d.

8. Redness diffused, ordinarily of little intensity, sometimes succeeded by other inflammations, and characterized by spontaneous linear divisions of the skin, in those parts alone where it is developed.

LINEAR INFLAMMATIONS.

See H. Table 2d.

10. Redness, at first more or less vivid and painful, afterwards suddenly violet, livid, or blackish, with but little or no pain, terminating rapidly in mortification of the skin to a greater or less extent.

GANGRENOUS INFLAMMATIONS.

See J. Table 2d.

12. Redness variable, alterations of the skin, difficult to refer to any ordinary forms of inflammation, having a continual tendency to extend or to reappear, observed in children of suspicious parents.

SYPHILITIC AFFECTIONS.

See L. Table 2d.

TABLE SECOND—GENERA.

INFLAMMATIONS.

A. EXANTHEMATOUS INFLAMMATIONS.

1. Red spots of a few lines to several inches in diameter, without tumefaction of the subcutaneous cellular tissue, sometimes so numerous as to produce a general red tint over the skin. This is the first of a great number of phlegmasiæ of the integuments. *This redness, ordinarily transient, is generally developed on those parts habitually in contact with urine, fecal matter,*

ERYTHEMA. See p. 95.

3. Small red points, soon replaced by large scarlet patches, indented at their borders, the exanthema soon becomes continued; the skin is burning, dry, and sensibly reddens to the touch. Color deeper at night; the surface of the body appears

2. Tint of the skin of a deep red, with tumefaction of the subcutaneous cellular tissue.

The redness does not consist of small patches, but of a large sheet. Irregularly circumscribed, it uniformly occupies a portion of the limbs, trunk, or face, to a greater or less extent. It is often accompanied with fever and gastric or cerebral symptoms. The redness always moves from one place to another, and is covered with phlyctænæ (phlyctenoid erysip.); the inflammation extends itself in the cellular tissue, producing suppuration (phlegmonous erysip.); eschars form (gangrenous erysip.); limbs are infiltrated (œdematous erysip.)

ERYSIPELAS. See p. 98.

4. Patches prominent, paler than the surrounding skin, accompanied with itching; the patches appear first on the limb, then upon the trunk; their form, number, and extent, vary much. They resemble the marks produced by nettles.

then as if it had been daubed with the juice of strawberries. Very rarely followed by desquamation.

It has three periods: incubation, development, and desquamation; ordinary complication, simple or malignant angina.

URTICARIA. See p. 106.

SCARLATINA. See p. 104.

5. First period. During the existence of the symptoms of angina or pneumonia, small red spots are to be observed, distinct, almost circular, *resembling flea-bites*; they appear first on the forehead, chin, nose, etc., then spread on the neck and limbs; they are accompanied by fever and itching, and great heat of the skin. Second period: other *semicircular patches mingle with the first; they do not give on touching them with the finger the sensation of a prominent surface*. In the interstices, the skin preserves its natural tint. Third period: at the end of four or five days, when the redness has disappeared, a slight desquamation ensues, accompanied with itching.

6. Patches, rose-colored, variously figured, not prominent, much larger and more irregular, separated by a number of spaces; sometimes the patches are *annular*; they are at first of a pretty dark red, soon becoming rose-colored. They are accompanied with itching, but no irritation nor smarting; the inflammation is more deeply stamped than in erythema; it is scarcely ever followed by desquamation; it is not contagious.

ROSEOLA. See p. 103.

RUBEOLA. See p. 101.

B. BULLOUS INFLAMMATIONS.

1. Large bullæ without an areola, preceded by a simple erythematic redness, constantly followed by a denudation of the inflamed corpus reticulare, with suppuration, more or less abund-

2. Tumors solitary, in small numbers, formed by an effusion of sero-purulent fluid between the epidermis, developed in parts that have been violently rubbed, accompanied with redness and

ant, and sometimes with a membrani-form excretion *caused by blisters*.

VESICATORIA. See p. 108.

3. One or more voluminous, yellow, and transparent bullæ, the eruption of which may be either simultaneous or progressive, terminating by an effusion of lymph, which concretes and forms a yellow scab, or gives rise to a superficial ulcer; these bullæ are usually round, and are preceded by red spots but slightly prominent. The areolæ formed by the disks of the erythematic spots, disappear during the growth of the bullæ. The skin is not deeply inflamed, neither has it any tendency to form deep ulcerations.

PEMPHIGIS (acute or chronic.)
See p. 108.

5. Inflamed vesicles and bullæ, surrounded by a small red circle, appearing particularly on one side of the trunk, disposed in the form of a band, producing a great itching; the vesicles open, ulcerate, and form yellow or black scabs.

ZONA. See p. 102.

heat; a thick fluid flows out when they are broken.

ESSERA. See p. 108.

4. Small bullæ, the bases of which are inflamed, few in number, flat, and filled with a fluid, at first serous, but soon thick, sanguinolent, drying in the form of black scab. The skin beneath them has a strong tendency to ulcerate. The ulcers become atonic, and are to be observed in badly nourished, debilitated, scrofulous individuals.

RUPIA. See p. 111.

C. VESICULAR INFLAMMATIONS.

1. Globular and transparent vesicles, filled with a colorless, or citron-colored fluid, of the
2. Small vesicles, very near each other, ordinarily whitish and very evident, accompanied

size of a grain of millet seed, *appearing in groups, more or less numerous, in different parts of the body*, accompanied with prickling, and separated by intervals, where the skin is often the seat of an inflammation, which only occurs in the interstices of the vesicles forming the group. These groups are irregular, arranged in a circle, or in the form of a crown.

HERPES. See p. 112.

3. Contagious vesicles, apyretic, slightly elevated above the level of the skin, color but little altered; transparent at their summits, *accompanied with an itching which compels the patient to be continually scratching*; more particularly developed in the folds of the articulations.

PSORA. See p. 116.

by a redness and tension of the skin, terminating by a re-absorption of the fluid contained in them, or by a rupture of the vesicles; succeeded by serous *exudation, more or less abundant*; the skin covered with very superficial scabs, formed by the destruction of the epidermis, and the concretion of the excreted fluid.

ECZEMA. See p. 113.

4. Pearl-colored vesicles, about the size of millet seeds, formed in great numbers epidemically, accompanied with fever, gastrointestinal inflammation, sweat abundant and fœtid, and with great irritation of the skin.

MILIARY SWEAT. See p. 117.

D. PUSTULAR INFLAMMATIONS.

1. After a fever of 14 to 48 hours, accompanied with gastrointestinal irritation, small *oblong, flattened, red spots* are seen, giving to the touch the sensation of a flattened seed, in the centre of which a *prominent vesicle is formed, containing a colorless, or a citron-colored humor*. Soon the base of the vesicle inflames, the vesicles break and leave in their place a yellow scab; these vesicles may be *conical, globu-*

2. After symptoms of gastro-pulmonary and intestinal inflammation of two or three days' duration, small pustules appear, at first *pointed*, but soon become umbilicated, distinct, and sometimes confluent. At the same time that the pustules assume an *umbilicated* form, and their centre becomes puriform, *the skin reddens and tumifies in a very remarkable manner*. At the end of eight or ten days, the

lar, or *umbilicated*. In general the duration of these pustules is only six or eight days; they have but one form during their various periods; they are always either conical, globular, or umbilicated.

VARICELLA. See p. 117.

3. After the insertion in the skin of a fluid taken from pustules on the teats of a cow, there appears at the end of eight days an elevated redness, which soon contains a *fluid, at first transparent, afterwards thick*; the centre of these pustules are depressed, their bases inflame and tumify, and finally the humor they contain is transformed into a *brown scab*, which detaches itself about the twelfth* day, and afterwards leaves a cicatrix.

VACCINIA. See p. 120.

5. Large pustules *elevated on a hard, circular, and very red base*, ordinarily separate, and appearing successively in various parts of the body. *They*

pustules begin to dry, and are covered with yellow or black scabs. After the fall of the scabs, *circular spots* appear on the skin, *of a reddish brown, afterwards cicatrices, more or less regular*; sometimes there occurs an abundant ptyalism. In general the duration of these pustules is from twelve to fifteen days. The pustules at first acuminate, do not become umbilicated, except during their progress.

VARIOLA. See p. 117.

4. After the insertion of the vaccine-virus in persons previously vaccinated, or who have had the small-pox, there appear *circular pustules, the borders of which are flattened and irregular, and are not swelled, containing in their centre a limpid yellow humor*. These pustules are accompanied with an insupportable itching; from the seventh to the eighth day, scabs form and fall off without leaving a cicatrix.

VACCINELLA. See p. 120.

6. Pustules, slowly forming *in the midst of a reddish, and sometimes violet, induration, which are to be seen on the cheeks, in the forehead, and on*

* This is evidently an error, the scab scarcely ever becoming detached before the 21st day.—S.

are soon covered with brown scabs, thick and adherent, beneath which there forms either a cicatrix or an ulceration. They often leave after them a chronic induration; they are developed more particularly in debilitated subjects.

ECTHYMA. See p. 121.

7. *Small superficial pustules irregularly disseminated on the scalp, where they exclusively exist; at first they are humid and irregular; to the pustules succeed gray or brown scabs, which are never depressed, the fragments of which are often found disseminated among the hair. When these scabs run together, and dry, they become hard, and are strongly attached to the hair with which they are intermingled. They are rarely communicated by contact.*

TINEA GRANULATA. See p. 127.

9. To a number of small red pimples, scarcely elevated above the level of the skin, *small yellow pustules* succeed, the summits of which are immediately covered with *irregularly circular scabs, strongly adherent, at first yellow, afterwards brownish, and always cupped in the centre.* These pustules are sometimes separated and sometimes agglomerated. They are particularly to be seen on the scalp; yet they may appear on

the nose. Sometimes these pustules are intermingled with small black points, formed by an alteration of the follicles of the face; *these pustules are never covered with scabs, and they almost always dry without ulceration.*

ACNE. See p. 122.

8. Small pustules, disposed in irregular groups, developed on the face and on the scalp, furnishing a large quantity of humor, adhering closely to the hair, *at first white, and but little projecting; they break, and are surrounded with red inflammatory patches; a red or greenish fluid issues from them, which is transformed into thin and yellow scabs, which, by an accumulation of a viscid humor, forms sometimes a perfect mask.*

PORRIGO LARVALIS. See p. 127.

10. *Circular groups of small yellow pustules on the scalp, elevated in the middle of red inflamed spots. The centre of the pustules is sometimes traversed by a hair.* The contents of these tumors thicken and form scabs, beneath which the skin is red and inflamed. The inflammation is propagated to the tubes of the hairs; the hair sometimes falls, but is afterwards reproduced; *the scabs are never hollowed in the cen-*

different parts of the body. *These scabs emit a disagreeable odor* on their being raised; beneath them will be found small red excoriations, superficial and lenticular. They will produce, after a length of time, a general or local baldness.

PORRIGO LUPINOSA. See p. 124.

11. Pustules acuminate, *developing on the chin, detached on a base of a vivid red.* The pustules are preceded by a slight smarting; little red points at first show themselves; they become more salient, their summits whiten, rarely exceeding the size of a millet seed; when the pustules are ruptured, an oozing takes place, producing a scab but slightly adherent. In this manner occur several successive eruptions; the chin and side of the face are soon covered with them, the pustules form in groups, their bases spread and thicken, the scabs augment, but they are never very thick nor very adherent; the subcutaneous cellular tissue inflames and becomes the seat of phlegmonous affections always remarkable for their red appearance.

MENTAGRA. See p. 122.

tre; the fluid of the pustules is always contagious, and infects successively various parts of the integuments of the cranium, where it is carried by the fingers of the patient.

TINEA ANNULARIS. See p. 127.

12. Small pustules agglomerated or distinct, developing on different parts of the body, but more especially on the face; they consist at first of small red spots, in the centre of which are formed *yellow pustules not acuminate*, accompanied with a great itching; they break at the end of five or six days, yielding a yellow fluid, which drying, resembles concrete honey. The oozing beneath the scabs augments their thickness; sometimes several eruptions succeed. After the fall of the scabs, the skin beneath is found of a violet color, covered with a newly formed epidermis.

IMPETIGO. See p. 123.

E. PAPULAR INFLAMMATIONS.

1. A number of small pimples, hard to the touch, com-

2. Small papulæ, sometimes scarcely visible, ordinarily acu-

pact, red or white, forming at first on the face, afterwards on the limbs, particularly in infants at the breast, never terminating in pustules, scabs, or ulceration, but leaving sometimes in their place a slight efflorescence, generally accompanied by a great itching; they may be scanty, intermingled with patches of erythema, or spread in great numbers over all parts of the body.

STROPHULUS. See p. 130.

3. Papulæ scarcely visible, causing a great itching; when torn by the nails, a sero-sanguinolent fluid issues, which concretes immediately, and forms a small black scab, sometimes accompanied with fever; they are always the seat of an insupportable itching.

PRURIGO. See p. 128.

minated, and hard to the touch, containing neither pus nor serum, accompanied by a disagreeable sensation, especially in the night; persisting for a long time, spread over the face and upon different parts of the body, rarely accompanied with febrile symptoms, appearing disseminated or sometimes grouped at the root of the hairs. When they dry, they give rise to the secretion of a fluid, which concretes in small humid scales. They are often complicated with vesicles or pustules. The nature of the disease may always be known by the presence of papulæ about the scales.

LICHEN. See p. 132.

F. TUBERCULAR INFLAMMATION.

1. One or more tubercles, of a medium size, flat or prominent, of a livid red, terminating, after several months or years, in ulceration, secreting ichorous pus, the concretion of which

2. Solitary tubercles, remaining a long time indolent; they are the seat of lancinating pain; they become violet, and ulcerate. The ulcers present inverted, hard, or fungous bor-

solid, adherent yellow scabs. The ulceration extends in depth, the borders remaining unequal and hard; they are continually covered with scabs, which fall of themselves.

LUPUS. See p. 133.

3. Numerous indolent tubercles, livid, and sometimes of the same color as the skin, developed principally in the face and the ears, as well as on the limbs. These tubercles sometimes ulcerate, and are covered with adherent scabs, beneath which are found cicatrices; the parts on which these tubercles are developed, acquire an increase of size.

GREEK ELEPHANTIASIS.

See p. 133.

ders; a sanious pus flows from them, and they diffuse a peculiar odor.

CANCER. See p. 133.

G. SQUAMOUS INFLAMMATIONS.

1. Scaly plates, *almost always circular*, of a whitish color, at first but a little projecting, resembling small spangles; they enlarge and rise; *their borders, surrounded by a red circle, are prominent, whilst their centres are depressed*; they afterwards form small red pimples, hard, grouped, but never pustular;—simple and isolated, they enlarge and multiply, preserving always their white and scaly appearance, together with their orbicular form; they cover, at the same time, one part or

2. Scaly plates, *never circular, of a red color*, at first small and projecting; they enlarge and rise, *but their borders are never prominent, nor their centres depressed*. They form afterwards, in groups, small red pimples, rarely isolated; they multiply promptly, *exhibiting an irregularly circumscribed surface*; they are often confluent with one another, appearing in several parts of the body, but more particularly on the face, trunk, and head; the inflammation of the reticular

several parts of the body, but appear to be more particularly developed in the projections and articulations.

LEPRA. See p. 133.

3. Small red patches, very thin, covering superficial scabs, which are continually detached in small fragments, sometimes purulent, and almost always replaced by new epidermic desquamations. It is usually seated in the scalp.

PTYRIASIS. See p. 136.

tissue imparts a deeper tint to the scales, which are sometimes cracked.

PSORIASIS. See p. 133.

H. LINEAR INFLAMMATIONS.

Linear divisions of little depth, developed usually at the bottom of the folds of the skin, or in the neighborhood of the different natural openings of the body.

FISSURA. See p. 136.

I. GANGRENOUS INFLAMMATIONS.

1. After a puncture by an insect, or with an instrument with which animals have been killed, an œdematous tumefaction of the skin is developed in a circumscribed point. In the centre of this tumefaction appears a violet colored ecchymosis, slightly prominent, beneath which a lenticular induration is formed, which is soon replaced by a reddish areola; or a gangrene, and an extensive disorganization of the subcutaneous tissue ensues. The patient, re-

2. In those infants where the circulation is slow, and the face and extremities blue, cold, and œdematous, there occurs at first about the toes and hands, and afterwards in other parts of the body, an obscure redness without tumefaction; the skin becomes brown, dries, hardens, and finally presents all the characters of gangrene. During the development of this disease, the infant, respiring with difficulty, and almost inanimate, exhibits all the precur-

duced to extreme debility, has frequent faintings, and in the space of a few days or hours, will be brought to the last extremity.

sory signs of death from slow asphyxia.

INFANTILE GANGRENE.

See p. 137.

MALIGNANT PUSTULE.

See p. 138.

K. INFLAMMATIONS FROM HEAT AND FROM COLD.

1. Erythema, erysipelas, bullæ, vesicles or gangrene, produced on the skin by caloric or caustic.

See p. 138.

2. Erythema, with engorgement of the cellular tissue, bullæ, fissura, gangrene; produced by cold on parts remote from the centre of circulation.

See p. 138.

L. SYPHILITIC AFFECTIONS.

Some of the species of diseases above described may assume a syphilitic character, which may be known by the eruption following other venereal symptoms; by their resisting the usual treatment of simple cutaneous diseases; by their constant tendency to spread and ulcerate; by their exhibiting a cupreous appearance, particularly on the use of mercury, sudorifics, and other remedies used for the treatment of syphilis; and, finally, by their manifestation under circumstances proper for the development of the venereal disease.

It is worth observing, that among all the cutaneous diseases which more often assume a venereal character, are the exanthemata, pustulæ, papulæ, and tubercula. On the other hand, of all the symptoms produced by mercury, cutaneous affections are the most frequent, concurring to render the diagnosis of syphilitic affections and mercurial eruptions both obscure and difficult. Physicians ought, on this account, to exercise great discrimination in examining the cutaneous diseases of young infants; they should not forget that they have need of all the circumstances connected with the case, the nature and mode of development of the affection they are called to treat, to enable them to make a correct diagnosis, since the anatomical characters are very variable, often

deceiving, and are not of themselves sufficient to confirm the judgment of the physician.

TABLE THIRD.—SPECIES.

ERYTHEMA.

Erythema *intertrigo*, caused by the contact of fœcal matters.

"	<i>combustio</i> ,	"	"	the action of fire.
"	<i>pernio</i> ,	"	"	the absence of caloric.
"	<i>paratrima</i> ,	"	"	lying on the part.
"	<i>à puncturâ</i> ,	"	"	a puncture.
"	<i>idiopathicum</i> ,			
"	<i>symptomaticum</i> ,			
"	<i>fugace</i> ,			
"	<i>marginatum</i> ,			
"	<i>papulatum</i> ,			
"	<i>tuberculatum</i> ,			
"	<i>nodosum</i> .			

All external causes capable of irritating the skin, may produce erythema, in some of the numerous varieties mentioned above. In general it is a very superficial inflammation, disappearing with great facility. It is rarely accompanied with any general derangement of the system.

Erythema produced by the contact of fœcal matters, is more often seen in new-born children, occupying the breech, upper part of the thighs, and scrotum; suitable care, and simple emollient lotions, are sufficient for its removal.

If it be very severe, seated around the anus, and if there exist at the same time a diarrhœa, it may be considered as a symptom of enteritis. I will recur to this subject hereafter.

During the exfoliation of the epidermis, the skin of the infant is often covered with erythematic plates, or striæ, situated in the folds of the joints. The scrotum and the superior parts of the thighs, are more particularly subject to these affections.

CASE IV.—*Induration of the cellular tissue, erythema of the scrotum, gastro-enteritis.*—Marcanel, aged twelve days, a male, en-

tered the infirmary on the 10th of May. This child was very small, and was affected with a general œdema; the epidermic exfoliation was in full activity. The scrotum, entirely deprived of its epidermis, was intensely red and tumified; the superior part of the thighs presented the same appearance. The child was feeble, his cry complete, but scarcely to be heard; respiration tolerably free, and the chest sonorous; the face, continually drawn up, expressed great pain; the alvine dejections were abundant, clear, and fœtid; the pulse was natural. The treatment consisted of diluent drinks and bran baths. He did not rally, and on the 16th of May, perished of marasmus.

On examining the body, after death, there were found congestions with sanguineous exhalation in the small intestines; an intense redness, with tumefaction and friability of the mucous membrane of the ileo-cecal region and commencement of the colon, and finally a passive congestion of the cerebro-spinal apparatus. The organs of respiration were healthy.

M. Rayer has given some analogous cases of erythema, in which emollient lotions were successful in treating it in children at the breast.*

It sometimes happens, without any exterior appreciable cause, that erythema spreads over different parts of the body, under the form of irregular patches, leaving intervals between them; without doubt these are what Bateman has described under the name of *erythema marginatum*. According to the English pathologists, this variety co-exists ordinarily with an internal affection, and may be accompanied with fever; I have observed one case of this kind, which will be noticed hereafter.

The erythema occurring on one of the cheeks at the time of the appearance of the teeth, about the umbilicus when the cord separates, over the two internal malleoli when the feet of the infant are compressed, hardly deserve our attention.

I believe I ought to consider as a case of *erythema nodosum* of Bateman, an affection of the skin which I observed in an infant, the subject of the following case.

CASE V.—†*Muguet, erythema nodosum*.—Marie Mosieux, aged thirteen days, of a medium strength, crying but little, respiring well,

* Rayer, vol. i., p. 104.

† *Muguet*, a variety of thrush. See p. 164.

with several spots of muguet on the buccal mucous membrane, which was slightly tumefied and of a very intense redness, entered the infirmary on the 12th of January, 1826. (*Barley, gum syrup, emoll. garg., abstinence from the breast.*) On the following day the muguet had made some progress; and on the 16th, at the inferior and internal part of the legs, there appeared irregular red patches, slightly elevated, and hard to the touch, three or four lines in breadth. They appeared to be painful, for the child cried on their being rubbed with the finger; the limbs were enveloped in compresses, wetted with a decoction of marshmallows. On the 18th they had still increased, the skin on one was excoriated; on the 20th, resolution had commenced, but the left limb still remained hard and swelled. From the 20th to the 25th, a great change had taken place in the condition of the child; the muguet had disappeared, and there only existed a violet redness of the legs, which however was not of much hardness, and on the third of February the child was returned to her nurse.

This erythema must not be confounded with a hardening of the cellular tissue, the history of which will be given hereafter; it appears to exhibit a great analogy to that which Bateman has observed in the legs of old females. With respect to this, and many others, we meet with striking analogies between the diseases of the two extremes of life.

For the present, we have only been considering acute erythema; as to the varieties of papular and tubercular erythema, they appear to relate to those affections which we have just considered. I have not had an opportunity of observing, in sucking children, the chronic erythema of which Rayer has given some examples, and which has been described by Alibert under the name of *dartre érythémoidé*. We shall see in the great number of cutaneous diseases, erythematic inflammation precede, accompany, and follow, the development of various species of phlegmasiæ.

The erythematic redness which is developed in the neighborhood of the genitals in new-born children, should be examined with close attention; and when they exhibit a red coppery color, and resist the continued applications necessary for the treatment of ordinary cutaneous affections, and when the surrounding cellular tissue becomes engorged, it will be necessary to obtain a

more exact information as to the health of the parents, and to be assured whether or not this erythema be not a syphilitic affection.

ERYSIPELAS.

Erysipelas	<i>simplex,</i>
"	<i>miliaris,</i>
"	<i>phlyctenoides,</i>
"	<i>eraticum,</i>
"	<i>phlegmonodes,</i>
"	<i>œdematodes,</i>
"	<i>capitis,—thoracis,—membrorum,</i>
"	<i>umbilici.</i>

It is well known that in adults, erysipelas is usually connected with some affection of the digestive organs, the functions of which are disturbed either before or after the development of the cutaneous disease, and that some authors regard it as a symptom of gastric disorder, or of gastritis. The history of erysipelas in young children is, in this respect, somewhat different. In the first place, it is to be remarked, that of all the cutaneous phlegmasiæ, it is the one which attacks the most frequently, because, without doubt, in an infant recently born, the sanguineous congestion of the integuments is a predisposing cause of this inflammation, and that the irritability of the skin, recently deprived of its epidermis and exposed to the contact of the alvine excretions, renders it more liable to become the seat of erysipelas, which frequently succeeds to the erythema of which we have been speaking.

During the year 1826, I observed in the Hospice des Enfants Trouvés, thirty cases of erysipelas; sixteen of them were simple; three œdematous; six phlyctenoid; four phlegmonous; and only one of the miliary form. In two the face was affected; sixteen, the trunk; and twelve, the limbs. Erysipelas of the trunk and limbs then, appears to be of more frequent occurrence than that of the face.

The ages of these thirty children varied from one day to a year; but it should be noted, that there were eighteen below the age of six months; four between six and eight months; and two from eight months to a year; but this proportion will not admit

of extensive application, because children below six months are more numerous at the Hospice des Enfants Trouvés than those of more advanced age.

Eight of these infants were affected with erysipelas of the superior extremities, and of the parietes of the thorax, following vaccination, and during the eruption of the pustule.

In the thirty cases just mentioned, sixteen were fatal, either from the simple disease, or from its complication; and among these sixteen, there were six simple, two œdematous, four phlyctenoid, three phlegmonous, and one miliary.

One case of erysipelas of the face was followed by gangrene of the mouth, terminating in the death of the child, but fifteen days old; another case of erysipelas of the face did not give rise to any unfavorable symptom. I scarcely remarked any gastric symptoms in these cases of erysipelas; but there existed symptoms of enteritis more or less violent, acceleration of the pulse, dryness and heat of the skin, and rapid emaciation; the frequency and nature of the cries of the child, together with the expression of the face, usually indicate suffering.

Upon examining the bodies of sixteen children that died, I found in two, gastro-enteritis; in ten, enteritis; in three, pneumonia, complicated with enteritis and cerebral congestion; and in one, pleuro pneumonia.

Of the four cases of phlegmonous erysipelas, it was situated in one, around the umbilicus and other parts of the parietes of the abdomen; in another, on the left side of the chest; in a third, on the hip and superior part of the right thigh. The patient died after a very extended disorganization and suppuration of the subcutaneous cellular tissue of this region; finally, the fourth was affected on the right leg. In four cases of phlyctenoid erysipelas, the disease appeared on the abdomen; in the remaining two, on the superior part of the thighs. The miliary erysipelas spread over almost every part of the body.

In no instance, in the rapid disappearance of the disorder, was it followed by any serious metastasis, as is observed in adults. Yet I believe this pathological phenomenon may occur in children.

Hoffman, and after him, Underwood, MM. Gardien, and Capuron, have directed their attention particularly to erysipelas of

children. Underwood has described, under the same name, gangrenous inflammation of the extremities; this, I believe, is incorrect. I will hereafter recur to this affection, when considering the gangrenous inflammations of the skin.

From the preceding considerations and observations, it results that erysipelas, in sucking children, is remarkable for the following characters: 1st. It is frequent at an early age by reason of the sanguineous congestion of the integuments at this period of life; 2dly. It is of more frequent occurrence on the abdomen, thorax, and limbs, than on the face or head. It may terminate either by resolution, epidermic desquamation, or by suppuration of the subcutaneous cellular tissue. It is less often accompanied by gastric symptoms than when it occurs in adults, but is usually attended with symptoms of enteritis; lastly, it almost always produces an acceleration of pulse, heat and dryness of the skin, together with pain and wakefulness. The duration is from six to twelve days. It varies from a simple erythematic redness to that of considerable tumefaction, hard to the touch, of an intense redness, and sometimes of a violet color.

The treatment should vary according to the complications. Emollient applications ought to be made to the inflamed integuments, particularly when the erysipelas has a tendency to terminate in suppuration, and also to prevent the formation of sinuses under the skin, which follow suppuration of the cellular tissue. The enteritic or pneumonic symptoms which supervene, should be met by the administration of mucilaginous drinks, with but little nourishment. The external causes which produce or continue the irritation of the skin, should be removed; such as the contact of fœcal matter, clothes either too hot, rough, or tight. If the affection be simple and superficial, there will be no occasion for any other than topical applications: an attention to diet and the use of emollient drinks, is all that is necessary; but should it not yield to these means, recourse must be had to slight scarifications and local bleeding at some distance from the limits of the inflammation; yet we ought to be careful about the extent to which we carry blood-letting in children. We will return however to the consideration of this subject in another place. Local or general bathing ought not to be neglected, and in the

last place, we should apply blisters on the inflamed part, as M. Dupuytren has recommended in adults.

It is important to remove the idea foulness of the bowels, or of gastric disorder, for although this complication is not chimerical, it rarely shows itself in infants at the breast affected with erysipelas.*

RUBEOLA.

Rubeola *vulgaris*,
" *sine-catarrho*,
" *nigra*.

Rubeola, or measles, the anatomical characters of which have been already described, is remarkable for the febrile state which accompanies it, and for its complications. The most common of these are inflammation of the trachea, bronchiæ, and lungs. The digestive organs are less often affected in the course of this eruption, and the cerebro-spinal apparatus does not become the seat of any derangement, except in certain individuals. At least, this is the result of the examination of the nature and history of this epidemic in different countries by a great number of physicians, particularly Sydenham, Mead, Morton, Pinel, and others.

Measles appears to be more common after, than before first dentition; for at the Hospice des Enfants Trouvés, those above the age of eight, or nine months, are those more affected with the disease. M. Baron has, for several years, remarked this; and during the year 1826, in six children attacked with it, there were four above the age of eight months. Three of them died; two from acute hydrocephalus, and the third from a severe pneumonia. In general, M. Baron has remarked, that anginose and cerebral affections, were the most ordinary complication of measles in children at the breast. The symptoms of gastro-enteritis are always of less importance when they exist, and they often do not show themselves until the end of the disease.

Other complications of measles, such as petechiæ, or different kinds of papulæ, appear in adults. As to its terminations, we would observe that, in young subjects, the cutaneous eruption is very frequently followed by anasarca or desquamation; the for-

* See Appendix.

mer termination, without doubt, is attributable to the little vital reaction, and to the natural slowness of the passage of the blood in patients who have been debilitated ; the latter, to the facility with which the epidermis exfoliates in infants.

The treatment of measles must vary according to its complications. It is observed that these have been different in different epidemics ; from this, no doubt, arises the predilections of certain authors for a favorite method of treatment. From this cause it is that some are so partial to emetics. Thus Pinel, who had only seen it prevail at the Salpêtrière in a very mild form, has recommended the expectant method, whilst Mead has advised bleeding as a remedy of universal application.

If the danger of measles is considered as arising from the nature of the complication, we should direct our attention to this accompanying disease. The treatment under these circumstances, will be found in the history of each of the organs which may become the seat of these complications. I will, in this place, confine myself to the attention which the patient requires with reference to the cutaneous eruption.

The drinks which have been recommended as suitable to favor the development of the eruption, ought to be administered with great caution. In case of metastasis, the warm bath appears to me very proper to restore the cutaneous irritation. Of this we must be very careful, should cerebral congestion supervene in the child. Emetics, when there is reason to believe the existence of gastric derangement, and purgatives, when it is necessary to relieve the bowels, should be given with much caution in young children in whom the alimentary canal is one of the parts most susceptible of irritation. We should also be careful in the use of remedies for the relief of debility, to which patients with measles are sometimes subject. We shall hereafter see what lesions ordinarily accompany the adynamic condition of young children ; and will then understand how dangerous it might be to give cordials and antiseptics in a pathological condition, as variable in its causes as in the interpretations which have been given to the term by which it is expressed.

Tonics are only useful in a state of extreme debility and marasmus, occurring after measles, and when they are not contraindicated by any organic lesion.

ROSEOLA.

Roseola *æstiva*,“ *autumnalis*,“ *annulata*,“ *infantilis*,“ *variolosa*,“ *vaccina*,“ *miliaris*.

Roseola is a very superficial inflammation of the skin, never spreading to such an extent as erythema, very often mingled with other symptoms, such as variola, vaccinia, etc., and of frequent occurrence in infants. Its varieties, which refer more to the period of its appearance and to the disposition of the spots, than to the difference in the symptoms, scarcely deserve attention.

I have often seen it develop itself on the surface of the body, neck, and limbs of sucking children, as well as of those just born. It appears to produce very great irritation of the skin, for some children cry much when they are attacked with it. Summer is the season in which it more particularly occurs. Its duration is very variable; and it often consists of nothing more than small patches of a rosy color, irregular and smooth, often appearing and disappearing every moment of the day. In the greatest number of cases there is neither fever nor any disorder in the digestive functions; and were it not for the cries and sleeplessness of the child, attention would be scarcely attracted to this slight eruption. Children are more subject to it at the age of six months to a year, than at an earlier period; and it more particularly makes its appearance about the time of dentition.

When this disease is not preceded by some other cutaneous affection, and no functional derangement accompanies it, it will be sufficient to administer to the child some mild anodyne, such as the syrup of poppies, in a little sweetened water, and to use ablutions at a low temperature.

If there exist, at the same time, any cerebral irritation, or any affection of the alimentary canal, or of the respiratory apparatus, the physician should meet these symptoms with suitable means.

It is particularly important to notice whether roseola be not the first appearance of a disease of more importance, the characters of which will afterwards more fully appear.

SCARLATINA.

Scarlatina *simplex*,
" *anginosa*,
" *maligna*.

Scarlatina is always accompanied with violent fever, very often with angina or ophthalmia, and sometimes with pneumonia, gastro-enteritis, or encephalitis.

Of all the complications, that of the throat is the most frequent and serious. Inflammation of the larynx or tonsils exists in a greater or less degree in almost every case of scarlatina, either at the commencement or in the course of the disease. It would seem that the other complications are only observed in such as are exposed, by a particular predisposition, to inflammations of the encephalon or of the alimentary canal.

Scarlatina prevails more particularly during second infancy and in youth, than during the period of sucking. This disease often appears at the Hospice des Enfants-Malade, while it is scarcely seen in the course of a year at the Hospice des Enfants Trouvés; and in 1826, when scarlet fever existed in this hospital, three children, aged from one year to fifteen months, were attacked with it, while none of a more tender age were affected. M. Baron has, for a long time, made the same remark, the correctness of which is evident when it is considered that all the epidemics of scarlatina prevail among children collected in boarding-schools or hospitals.

Be this as it may, I admit that scarlatina does not affect children in the first infancy in the same manner as it attacks those of more advanced age. It appears first in a simple form, that is to say, with a slight febrile action, without apparent lesion of any organ; secondly, with affections of the throat, either simple, croupy, or gangrenous, the most distressing and the most common complications of the disease. Finally, this eruption may assume a fatal character by the simultaneous development of menengitis, of encephalitis, or gastro-enteritis, giving rise to a

serious train of symptoms, constituting the adynamic fever of authors.

The treatment of scarlatina must vary according to the simple or complicated condition in which it exists.

When it is simple, it will only be necessary to moderate the febrile action and cutaneous irritation, by attention to diet and the use of emollient drinks at first, afterwards slightly acidulated. The patient ought to be removed, that no communication may exist between him and other children, for this phlegmasia is almost always contagious. If the redness of the skin, together with the reiterated cries of the child, indicate excessive irritation of the integuments, it should be tranquillized by emollient lotions, slightly narcotized, applied to the body and limbs, such as the decoction of marshmallows and poppy heads; but not by the internal administration of opium, as recommended by Sydenham, except with the greatest caution, under the apprehension of irritating the brain, the inflammation of which is often a complication of scarlatina.

Dr. Currie, of Liverpool, has spoken in high terms of the external application of cold water in the treatment of some acute diseases, and Bateman has recommended it in the treatment of scarlatina, to produce a favorable diaphoresis.

This remedy, known from the highest antiquity—since it appears to have been used by Antonius Musa, physician to Augustus—ought only to be employed by the most experienced and the most prudent; if the traditions accredited by M. Leclerc are to be believed, Musa himself appears to have suspected that by this means the premature death of the young Marcellus was hastened, the name of whose disease has not come down to us; but the remembrance of this fact, if it be true, should not hinder our using this agent with the precautions mentioned by Bateman. If we are unable to throw cold water over the body of the patient when the skin is dry and hot, for fear of terrifying the mother or nurse, we ought at least to sponge the face, neck, arms, and body, with cold vinegar and water.

The practitioner ought to abandon the old routine of enveloping the patient in a triple covering of bed clothes; but direct the air of the bedroom to be renewed, carefully avoiding the exposure of the patient to sudden changes of temperature.

The complications of scarlatina, such as ophthalmia, encephalitis, pleuro-pneumonia, angina, enteritis, and the symptoms known under the vague title of putrid, demand particular notice, and will be duly considered in the different parts of this work devoted to the history of these diseases.

After the disappearance of febrile symptoms, redness of the integuments, and the symptoms complicating this disease, the physician will still have to encounter anasarca, a sequela of very common occurrence in scarlatina.

M. Viesseux, of Geneva, has recommended that great care be also used in preventing children from being exposed to the cold air for some days, or even weeks, during their convalescence, because he attributes the infiltration of the cellular tissue to the action of this external agent. Sydenham has advised laxatives after the period of desquamation. I think they are useful if there exist no symptoms of gastro-enteritis; they may be followed by mild tonics, such as a teaspoonful of Malaga wine, or wine of Cinchona, particularly where the circulation is habitually slow. Finally, many physicians recommend dry or aromatic frictions, fumigations slightly stimulating, tepid or stimulating baths. In addition to these, I would recommend enveloping the child in fine soft flannel, applied next to the skin. These means, together with exercise and moderate nourishment, should be pursued or suspended, according to the particular indications; and, if properly directed, will serve a much better purpose than stimulants, solvents, deobstruents, drastics, and other violent remedies, so often praised in the treatment of dropsy.*

URTICARIA.

Urticaria febrilis,

“ *evanida,*

“ *perstans,*

“ *conferta,*

“ *subcutanea,*

“ *tuberosa.*

All these varieties of urticaria pointed out by Bateman and

* See Appendix.

Frank, depend ordinarily on the varieties of form and complication of the eruption. I think it most important to note the three following varieties: First, urticaria arising spontaneously without any febrile action, with nothing but an itching sensation in the part of the integuments accompanied by the eruption; secondly, urticaria arising from indigestion in the stomach of food badly prepared, or composed of principles obnoxious to the system, such as muscles, under certain circumstances; lastly, when accompanied by fever, more or less violent, continued intermittent, or remittent; the eruption then is moderate or severe, appears and disappears, according to the remissions or intermissions of the fever.

I have sometimes observed urticaria without fever in infants at the breast, appear and disappear several times in the day, without giving rise to any unfavorable symptom. Yet the crying and restlessness of the child led me to believe that a great itching must have been experienced. Underwood, who has spoken of this mild variety of urticaria, says that it disappears ordinarily in a very short time.

Thus, then, urticaria is, in infants generally, a mild disease, and it is commonly in adults that it is accompanied with febrile symptoms, and a greater or less disturbance of the digestive organs.

If it show itself in young infants with but little intensity, attention to diet and the ordinary rules of hygiene, will be all that is necessary. In case of a long continuance of this disease, Underwood advises the use of a few grains of the compound powder of contrayerva, or of absorbent powder with the addition of a few drops of ammoniated alcohol. But of what utility is this treatment? Is there any thing more vague than this advice? Would it not be better to seek for some functional or organic lesion, on which the continuance and obstinacy of the disease may depend, and direct the treatment accordingly?

Should it proceed from indigestion, or from any kind of poison, it would then be proper to give a mild emetic to relieve the stomach from the irritating substance which it contains; and if the cutaneous eruption appear on the access of an intermittent fever, the administration of a febrifuge is very naturally indicated.

BLISTERS.

It is unnecessary to stop and describe at length, this artificial inflammation of the skin, which, as we shall hereafter see, may either be of great utility, or give rise to the most serious symptoms in children, according as they may be well or badly employed. The effect of blisters in exhausting the patient by the secretion which they produce, should never be lost sight of, as has been remarked long since by Baglivi, Pinel, Corvisart, and Broussais. This remark is particularly applicable to diseases of children.

ESSERA.

When care is used in clothing infants properly, that is to say without bandaging them in the cruel manner formerly practised, they will rarely have this affection, for it is always the result of mechanical pressure on the part.

PEMPHIGUS AND POMPHOLIX.

Pemphigus, for the first time described by Sauvage, and united by Bateman to what he calls pompholix, an eruption, the anatomical characters of which differ from the former only in a slight degree, has, for a long time, been considered as essentially united to a species of fevers denominated vesicular. But since the publication of the excellent work of Gilibert, Pinel and other pathologists have denominated pemphigus, the cutaneous affection characterized by the development of erythematic patches over different parts of the body, on the surface of which bullæ arise, which soon break, leaving a viscid yellowish fluid. This fluid concretes, and forms on the ulcerated surface a slightly projecting scab, often granulated and yellow, like honey, or rather approaching to a fawn color.

This eruption is sometimes accompanied with fever, and is sometimes apyretic. Its duration may be either for a short or for a long time; hence the distinction between acute and chronic pemphigus—a very correct distinction, and of great practical utility.

Acute, apyretic pemphigus, is very common among children

at the breast; the febrile variety is more rare; chronic pemphigus is sometimes met with. Willan has noticed in infants, pemphigus to which he has given the name of *infantilis*. I have seen the acute form of the disease several times at the Hospice des Enfants Trouvés, and the following case appears to present, with great variety, the characters of this affection when occurring in sucking infants.

CASE VI.—*Acute pemphigus, muguet, Enteritis*.—Caroline Perneau, aged four months and a half, had been, from birth, in charge of the nurses at the hospital; on the 12th of January, 1826, was attacked with diarrhœa; she became pale; could not sleep, and took the breast with less eagerness. She entered the infirmary on the 15th of February, and exhibited the following appearance: strength moderate; face pale and a little shrunk; but the body and limbs still preserved their firmness and vermilion hue; she cried but little; the base of the tongue was covered with muguet; the buccal mucous membrane was of an intense red; the pulse beat about ninety; urine abundant; was affected with a diarrhœa of a yellow color; (*gummed rice water, starch injections, abstinence from the breast.*) On the following day there appeared on the cheeks a few small, slightly transparent bullæ, some of the size of a hemp-seed, others of that of a lentil, and all of them arising in the midst of erythematic spots. The appearance of these bullæ did not augment the distress of the child, who neither cried nor manifested any distress, notwithstanding the pulse was accelerated and the skin dry and burning. On the 19th, the bullæ on the face had disappeared, or had been torn by the fingers of the child; in their place, was a yellow superficial scab, surrounded by a red mark or circle, without tumefaction. The diarrhœa continued; the muguet had spread over the rest of the buccal membrane; the child became much emaciated; pulse from 110 to 115. On the 20th, other bullæ appeared on the neck and upper part of the chest; but they were smaller than those on the face, the scabs of which had begun to fall, leaving beneath them a red mark. On the 22d, the bullæ on the neck had undergone the same change in the formation of scabs as those on the face, which were, for a second time, covered with very thin yellow concretions. On the 25th the child vomited her drinks; the paleness and emaciation increased; the pulse was a little more frequent. From the 25th to the 30th, she gradually sunk, other bullæ showing themselves successively on

the parietes of the thorax. On examining the body, the brain was found a little injected; the tongue and velum covered with muguet; œsophagus violet-colored; stomach covered with red spots; the small intestines healthy; and on the internal membrane of the colon appeared striæ, red patches, and a very evident tumefaction; the liver was healthy; the lungs gorged with blood—the right congested at the summit; the heart also was filled with blood.

This eruption appeared to me to present all the characters of pemphigus, or of pompholix; and it was here complicated with colitis and muguet.

It appears as if this cutaneous inflammation may be developed without this complication, for Willan has described, under the name of *pompholis benignus*, the successive appearance of transparent bullæ, about the size of a pea, and sometimes of a hazelnut, on the face, neck, and limbs of young children, during dentition, and of only a few days' duration.

When the pemphigus is simple, bathing, together with emollient lotions and mild regimen, will be sufficient for its treatment; but if it be complicated with fever or enteritis, it requires close attention on the part of the physician. Lastly, if pemphigus become chronic, great difficulty will then be experienced in its treatment; for children affected with chronic pemphigus are usually reduced to marasmus, and present but little chance for the action of remedies suitable for the management of inflammation. Willan and Bateman have, in these cases, recommended tonics and nutritive diet; and cinchona has been used internally, and also externally, in the form of a lotion to the skin, by some physicians; baths, not hot, as Willan advises, but at a low temperature, will be found useful remedies; ablutions with vegeto-mineral water; frictions with oxygenated pomatum, (*unguentum acidi nitrosi E.*) in the parts where the ulcerated derma is continually covered with new scabs; a change of nurse, of food, and of climate; daily exposure to the external air, but only for a short time each day; the selection of good milk when the child is artificially nourished, are the general indications for the treatment of this disease in young infants. Pinel has advised to abstain from all topical applications, and not interfere with the progress of the disease. This is, no doubt, proper in the case of acute pemphigus, accompanied by fever, of which it is, as we may say,

but a symptom ; but is it wise to remain a tranquil spectator of the progress of the phlyctenæ and ulcerations, which in chronic pemphigus undermine, by pain and exhaustion, the constitution, and shorten the days of the little patient ? I think not.

RUPIA.

Rupia *simplex*,
" *prominens*,
" *escharotica*.

Rupia is met with in scrofulous children, who are badly nourished and debilitated. Certain atonic ulcers of the legs which follow bullæ, the development of which has sometimes escaped the notice of the physicians, are no other than true rupia, recognizable particularly by the form and color of the scabs that are continually rising to their surface.

Bateman notices three varieties of rupia : small phlyctenæ, which are filled with a clear lymph, situated on different parts of the body, where, breaking and spreading, they produce small black scabs, constituting that form of the disease denominated rupia *simplex*. If the scabs are raised, conical, striated, or rugose, it then takes the name of *prominens* ; and that of *escharotica*, when the vesicles, which show themselves, in general, on the loins, thighs, and legs, contain a sanious or corrosive fluid, and, terminating by sloughs, produce, on being detached, deep ulcerations. This last variety, according to Bateman, is frequently observed in those infants at the breast previously much reduced by sickness, badly nourished, or badly clothed.

I have not had an opportunity of seeing rupia *escharotica* at the Hospice des Enfants Trouvés, where infants are often found in the condition described by the English pathologist ; but I have often seen on the legs and thighs of children reduced to marasmus, phlyctenæ or ulcerations afterwards covered with solid black scabs, presenting the characters which Bateman calls rupia *simplex*.

The scabs should be removed by the aid of cataplasms, and the ulcerations beneath dressed with perforated linen spread over with cerate of acetate of lead ; the ulcerated surfaces ought also to be washed from time to time with wine and water, or a weak decoction of cinchona or alum-water ; powdered alum, or

cream-of-tartar may be sprinkled over the ulcer; at the same time administering tonics internally, such as a weak decoction of wild cichory, hops, cresses, or saponaria. The strength of the patient should also be promoted by allowing aliments that abound in nutritive principles. In every case, the condition of the alimentary canal ought to be closely watched.

ZONA, OR ZOSTER.

This disease, although common in adults, is rarely observed in infants at the breast; I have seen but one instance of it in eight hundred children that were admitted into the infirmary during the year 1826.

This eruption is usually connected with a more or less marked derangement of the functions of digestion; it is almost always preceded or accompanied by some degree of debility, and causes much sickness and pain, particularly when the bullæ, or the vesicles which are mingled with them, break; they then give rise to superficial ulcerations, which are soon covered with very thin yellow scabs.

The treatment ought to consist of such means as are suitable for the management of disordered digestion. Topical applications to the ulcers should be dispensed with altogether, at least until the excessive pain demands the use of emollient and anodyne cataplasms.

HERPES.

Herpes *phlyctænodes*,

“ *iris*,

“ *circinatus*,

“ *labialis*,

“ *præputialis*,

“ *auricularis*.

Willan, Bateman, and M. Rayer, have described, under the name of herpes, a disease different from that which bears this name in the works of MM. Lorry and Alibert. Every body has observed these little vesicles, which appear on the lips of those who have recently experienced an attack of fever, at first vesicular, then exhibiting an excoriated surface, covered with a yellowish scab; this is the eruption designated by the English

pathologists under the name of herpes *labialis*, and will give an idea of the genus herpes.

The general symptoms, usually accompanying herpes, are of little moment; it is not a disease peculiar to infancy; yet some of the varieties may be met with in young infants.

The species of herpes are established—1st, According to the form of the groups or vesicles: Herpes *phlyctænodes*, globular and transparent vesicles, about the size of a millet seed, appearing in different parts of the body, generally preceded by red spots, more or less extended, and attended with a violent itching. Herpes *iris*, vesicles surrounded with concentric rings of various colors. Herpes *circinatus*, characterized by erythematic spots, surrounded by an areola of vesicles. 2dly, Others take their names from the seat of the disease: Herpes *labialis*, herpes *præputialis*; groups of small globular vesicles, accompanied with pruritis, developed on the external or internal surface of the lips and prepuce. There are also herpes *auricularis*, *palpebralis*, *vulvaris*.

When herpes *præputialis*, or *vulvaris*, is observed in young infants, we should examine whether it be of a venereal nature, and notice particularly the form of the vesicles, the slight circle that surrounds them, the color of the scales which succeed them, and the effect of the remedies used.

The treatment of herpes ought to be simple, since there are scarcely ever any complications in this disease. Demulcent or slightly acidulated drinks should be administered, and emollient lotions applied to the part; or when the scabs are constantly forming on the surface of the superficial excoriations which succeed the vesicles, the affected part may be washed with a weak solution of alum.

ECZEMA.

- Eczema *solare*,
- “ *impetiginodes*,
- “ *rubrum*,
- “ *acutum*,
- “ *chronicum*.

This disease has been confounded with psora, and some au-

thors have described it under the name of "*dartre squameuse humide*."—(Alibert.)

The rounded vesicles, surrounded by small red circles, which characterize eczema, show themselves in a distinct form on the face, limbs, and upper part of the thighs. They disappear promptly either by absorption, or by having discharged the fluid they contained, and which concretes in the form of thin scabs. In such a case, eczema may be considered as acute; it scarcely affects the health of the patient, and requires nothing more than good nursing, demulcent regimen, and emollient baths.

But when it resists these simple means; when, assuming a chronic character, the vesicles are continually renewed, or spread, multiply, and mingle together, producing an abundant secretion, and forming a number of scabs, beneath which numerous vesicles arise without cessation; then emaciation, pain, disorder of the digestive functions, and febrile reaction ensue, seriously affecting the health of the patient, the case then demands the especial care and attention of the physician.

In general, eczema may be either acute or chronic; and it is more frequently met with in youth and adults, than among old people or infants at the breast. Yet, there is variety of eczema often to be seen among the latter; it occurs in the scalp, and is known by the formation of small bluish vesicles on the head, and upon discharging a fluid which quickly concretes, produces a disease somewhat resembling tinea.

I have often noticed on different parts of the trunk and limbs of new-born children, small distinct vesicles, each surrounded by a little red circle; they appear suddenly, and often end in resolution; but sometimes breaking, produce small superficial scabs. These vesicles are two, three, or four in number, far removed from each other; and are met with indifferently on the face, trunk, and limbs; and, except as to their number, they exhibit the strongest marks of eczema. I have no doubt of this being a variety of the disease now under consideration. I have met with it in children scarcely a day old, and have thereby been led to believe that the child has brought the affection with it into the world. The sisters of the Hospice des Enfants Trouvés, in consequence of the dread which even the shadow of a disease, if we

may so speak, of a venereal nature inspires them, are in the habit of regarding these vesicles as venereal pustules, and adopt, in every instance, an anti-syphilitic treatment. M. Baron does not ordinarily participate in this fear, and I have seen these vesicles disappear of themselves at the end of a few days after the children have been in the infirmary.

Mercurial eczema may, without doubt, be developed in infants nursed by women who have used mercury internally or externally; but I am not acquainted with any case of this kind.

The treatment of chronic eczema is as difficult in its choice and direction, as it is uncertain in its results; yet the general principles of treatment must be borne in mind. Thus we should consider primarily of what nature are the symptoms of reaction; what the seat of the concomitant alterations of the cutaneous eruption; whether the obstinacy with which the vesicles and scabs are produced, be owing to the peculiar alteration of the fluid, as was formerly taught, and as some physicians at the present day believe; or whether the alteration in the cutaneous secretion be the result of a change in the tissue, and in the nutritive activity of the organ charged with this secretion. The physician should always endeavor to modify the actual state of the constitution of the patient, that the disease with which he is affected may be successfully treated. To accomplish this object, several therapeutic means have been advised. As external applications, emollient baths, saturnine lotions, solution of nitrate of silver, diluted muriatic acid, cataplasms of chelidonium *minus*, sulphurous vapor baths, etc., are recommended.

As internal remedies, there have been used the vegetable acids; solutions of the preparations of arsenic; tonics, such as *serpentaria virginiana*, cinchona, tincture of cantharides, bitter sweet, or sulphurous preparations.

I have confined myself to the simple mention of these remedies, as experience will not allow me to speak confidently in relation to their efficacy, and the judicious practitioner will neither reject them altogether, nor use them exclusively; but after having made trial of simple and rational means ineffectually, will perhaps be obliged to resort to them for the management of a disease which often defies all his efforts, selecting such as will do

the least injury to the patient; watching closely the digestive organs and the peculiar state of the constitution.

PSORA.

Psora simplex,
“ *complex.*

Psora is a vesicular disease, which some physicians, among whom is Morgagni, attribute to the presence of an insect, (*acari* *scabiei*.) M. Galès has even discovered its form; but MM. Alibert and Biète have in vain searched for it, although aided by microscopic instruments.*

Psora may be simple, exhibiting on various parts of the body, but particularly in the folds of the articulations, only the little vesicles which are its characteristics. It may also be complicated; that is to say, having between the vesicles different kinds of cutaneous inflammation; such as eczema, prurigo, lichen, strophulus, ecthyma, etc.

In both cases, it is almost always apyretic and contagious; it is developed in those children who are badly clothed and badly nourished. It is usually communicated by nurses, in which case it appears on the thighs and breech, because these parts are applied to the arms of those persons who carry, or habitually attend them.

Psora rarely gives rise to general symptoms of a serious nature. Nevertheless, in young infants we ought to exercise a severe scrutiny into all the symptoms which may, at the same time, be developed; and in the event of any important organ becoming the seat of an inflammation more or less violent, it should be treated with promptness and energy. As to the treatment of the cutaneous disease in particular, those applications, in the case of young infants, ought to be used which are the most simple. Among the number of curative means, ablution with artificial Barège water, alternating with the bath of marshmallows, or of bran, will be found the most convenient for children at the breast. The efficacy of these means has been proved in adults, and in children more advanced in age than those now

* See Appendix.

considered ; but I have no doubt, that this remedy will be found equally applicable to very young infants.

MILIARY SWEAT.

The miliary sweat, the characters of which have been already described, prevails generally as a sporadic disease. It is principally observed in youth and in adults ; but I know not whether it may not also attack infants at the breast. In every instance, these children ought to be isolated, and all those not affected, removed from the country where it prevails ; the symptoms of gastritis, with which it is almost always complicated, watched with care ; neither should the sudorifics, with which the patients are too often gorged, be allowed to be administered ; nor the practice of keeping the patient awake under the fear that the brain may otherwise suffer, be continued.

VARIOLA, VARICELLA, AND VARIOLOID.

Variola is not a disease peculiar to infancy, but it affects equally individuals of all ages ; yet it is of more frequent occurrence at the period of second infancy than among infants at the breast or among adults. The diversity of ages does not influence this disease so much as the difference of the nature and seat of the complications, for the anatomical character of the eruption remains always the same.

The history of this disease comprehends nosological details of the highest interest ; and the labors of pathologists, in attempting to discover the origin of variola, and to understand the true nature of its varieties, would themselves form the subject of an extended monograph. I will content myself with the exposition of the facts generally admitted in relation to varioloid.

This eruption is ordinarily preceded and accompanied by fever, and more or less disorder of the digestive functions, sometimes by angina, pneumonia, encephalitis, or meningitis.

Variola usually passes through periods distinguished in the following manner,—that of irritation, eruption, suppuration, and desquamation. The pustules exhibit, during these periods, a series of anatomical characters, which have been already described in the table of genera.*

* See p. 88.

It is again distinguished into simple, discrete, and confluent. Some pathologists, among whom is Adolphus Henke,* have pointed out a great number of varieties of variola, such as serous, siliquoze, verrucous, sanguinolent, or purple, etc. Other species have been denominated catarrhal, malignant, nervous, putrid—distinctions which have been admitted for a long time by the most celebrated nosologists, such as Sydenham, Van Swieten, and others.

Without attaching much importance to all these varieties, we should still keep two things in remembrance: sometimes variola only exhibits the symptoms that strictly belong to it, or those which result from its usual complication, gastric or pulmonary affections; sometimes, on the other hand, inflammation of a vital organ ensues suddenly; the practitioner ought then to direct his attention as well to the plegmasiæ thus developed, as to the cutaneous inflammation, and use for both affections the suitable therapeutic means for their relief.

The term varioloid has recently been applied to variolous eruptions appearing on those who have been vaccinated. M. Moreau de Jonès asserts that varioloid is a disease distinct from common variola in its symptoms, its effects, and in its origin; that neither the ordinary small-pox nor the vaccine disease is a protection against its contagion; that the vaccine virus, in every instance, modifies its pernicious influence. (*Mem. read at the Acad. roy. des Science*, Oct., 1827.) An attentive examination, however, has proved that this kind of variolous eruption which occurs in those who have been vaccinated, does not differ, with respect to its anatomical characters, from that which arises in patients who have not been vaccinated; that they even offer the same complications, and, in general, they are neither more mild nor more mortal. Dr. Thompson, of Edinburgh, showed me some very correct paintings of variolous eruptions developed after vaccination, the characters of which did not, in any respect, differ from the eruption of small-pox. I particularly noticed among these drawings, that of a young man who had been vaccinated by Jenner. The word varioloid, which Dr. Thompson himself

* *Handbuch zur Erkenntnis und heilung der kinderkrankheiten von A. Henke*, 1821.

uses, is nothing more than a conventional term applied to variola arising after vaccination, and to which there ought not to be attached any peculiar signification, or any idea that will establish or justify any appreciable difference in the anatomical characters of this disease, in its form, its progress, or in the duration of its symptoms.

The prognosis of variola is unfavorable in proportion to the importance of the organ which is the seat of the complication; thus, in young infants, encephalitis, and particularly meningitis, are fatal complications, and unhappily of too frequent occurrence.

The name of varicella is given to an eruption, the form of which differs from that of variola, properly so called. Its peculiar characters have been before described. This eruption, quite distinct and very mild, is rarely accompanied by any unfavorable symptoms; it scarcely ever produces fever, and is to be found indifferently in those who have, or have not, been vaccinated. It usually disappears after a few days continuance, and never leaves after it any deep scars.

The treatment of variola should be confined to the use of demulcent drinks, and to a strictly antiphlogistic regimen, when there are no serious complications added to the eruption; but should there arise an intense gastritis, pneumonia, angina, or meningitis, it will then be necessary to meet the complication by the use of appropriate means, which will be considered when treating of the history of each of these diseases. Care should be taken to avoid the treatment of what is still vaguely denominated a state of ataxia or putridity, by the administration of tonics and stimulants; such medicines will act much more fatally on young children, because they are more disposed to inflammation of the gastro-intestinal apparatus, at all times much disposed to phlegmasiæ. Among all the means recommended to facilitate the progress of the eruption, and to diminish the pain and fever, opium is the most prominent, the success of which is supported by the experience and authority of Sydenham,* Huxham,† Morton,‡

* *Sydenhamii opera*, sect. 3, cap. 2.

† *Opera phys. med.*

‡ *De variolis*, cap. 7.

Werlhof,* Van Swieten,† Frank,‡ Hufeland,§ and A. Henke.|| The latter mentions his having used it with great advantage in the small-pox, in 1802, at Brunswick. When the child manifests great distress by its cries, wakefulness, and restlessness, a little syrup of poppies may be given in its milk with advantage. Sydenham never gave opium except to patients advanced in age, and with the greatest caution; he preferred for infants laudanum, or syrup of poppies; but he never used it except compelled by the universal excitement of the patient. This medicine should certainly be given with care; and when convulsions arise, a symptom to which children are very liable in the course of variola, it would be better not to have recourse to it until after having endeavored to calm the irritation of the patient by tepid baths or blood-letting, practised according to the rules laid down in speaking of the diseases of the cerebro-spinal apparatus.

VACCINIA.

Is there any need of referring here to the origin of the discovery of Jenner, when public gratitude has for ever engraved it upon the memory of men? It is useless any longer to copy that which has for twenty years been repeated in every book published on this subject. We are indebted, moreover, to the researches of G. Pearson, M. Husson, R. Willan, and a number of others, for some highly valuable documents on the history of vaccination.

The process of vaccinating is so simple that it has become popular, and its effects are at this time so well known and appreciated, that no one can any longer hesitate to protect children by means of this preventive from one of our most fatal diseases. Yet the success of vaccination has lately been brought in question, because there have been several individuals affected with variola who had been vaccinated. The serious doubts raised as to the efficacy of vaccination as a preventive of small-pox, have been thought worthy of the attention of the *Académie royale de Médecine*, and a commission was appointed by that body, charged

* *De variolis et anthracibus.*

† G. Van Swieten, *comm. in Boerrh. t. 5.*

‡ *Epitome de curandis hominum morbis.*

§ *Bemerkungen, über natürliche und gaimpft Blattern.*

|| Henke, *loco cit.*

with the examination of the facts relating to this important point in pathology. In a report, remarkable for its clearness, and for the excellent spirit with which the facts alleged on both sides of the question were examined, M. Paul Dubois, secretary of the commission, has demonstrated that although vaccination has failed under some circumstances, it has not the less modified, in almost every instance, the variolous affections, when it has not entirely preserved individuals from an attack of the disease. So that the discovery of Jenner deserves still the confidence which it had acquired by its success in innumerable cases; and if its infallibility is not demonstrated, it is at least impossible to harbor a doubt of its immense utility. M. Moreau de Jonès has remarked, that the modifying influence of vaccination is so great, that, in the United States, among individuals vaccinated, that are attacked with variolous disease, scarcely one per cent. are fatal, whilst one half of the non-vaccinated, of those who take the disease, die.*

Vaccination may be performed at all ages; yet I must observe that the congestion of the integuments, during the early days of life, appears to contra-indicate the operation at this period. I have seen, at the Hospice des Enfants Trouvés, where infants are vaccinated very young, a severe erysipelas form on the vaccinated limb.

It will probably be thought a proper place to enter upon the details of the history of spurious vaccination, and of the eruptions resembling cow-pox, which are developed on the arm after the insertion of the virus; but, apart from the great number of subjects of which I am obliged to treat in this volume, compelling me to speak briefly on each, I feel no disposition to commence the discussion of one still in litigation.

ECTHYMA.

Ecthyma *vulgare*,
" *infantile*,
" *luridum*,
" *cachecticum*.

Ecthyma, which consists, as we have already seen, of large pustules, elevated upon a hard, red, and inflamed base, and

* See Appendix.

covered with greenish yellow scabs, is seen more especially in children that are feeble, badly nourished, and badly clothed. This disease is not contagious; but it often succeeds affections that possess this character, such as variola, rubeola, scarlatina, and psora. In general, ecthyma is connected with a chronic affection of the digestive or respiratory apparatus, and is developed often in the emaciated condition to which children affected with these diseases are reduced.

The pustules of ecthyma appear more particularly on the neck, shoulders, arms, and breast. Sometimes there is but one eruption developed, which runs its course in a very short time; in other cases the eruption is renewed without ceasing, multiplies, spreads, and becomes confluent. This difference in the course of the disease, has caused a division, by authors, into acute and chronic; in both cases there is always lassitude, rapid emaciation, and other violent symptoms.

Bateman, regarding only the state of cachexia which accompanies ecthyma, has recommended the use of tonics, such as cinchona, Virginia snake root, sarsaparilla, and the preparations of antimony. But would it not be better at first to remove the child from the external causes capable of keeping up the wasted and debilitated condition, to subject it to a better directed and more suitable diet; to immerse it in mucilaginous and emollient baths, and to consider the condition of the digestive organs before admitting tonics? As to the external treatment, it should consist of emollient applications.

ACNE.

Acne simplex,
 “ *punctata,*
 “ *indurata.*

Acne has not as yet been observed in infants at the breast; it is scarcely ever developed until after puberty; I must therefore refer, for the detailed history of this disease, to works *ex professo* on cutaneous diseases.

MENTAGRA.

Mentagra is not an infantile disease; it appears almost always in adults, and particularly in those persons in whom the chin is covered with a thick strong beard. It should not be confounded

with *porrigo larvalis*, which sometimes appears at first on the chin.

IMPETIGO.

Impetigo figurata,
 “ *sparsa*,
 “ *erysipelatodes*,
 “ *scabida*,
 “ *rodens*.

The varieties of impetigo described by Bateman, are evidently too numerous, and I think it would be much better to have but two, as described by M. Rayer—*impetigo figurata* and *impetigo sparsa*.

Impetigo figurata ordinarily appears under the form of patches resulting from the agglomeration of several small pustules, which soon excoriating, form thin yellow scabs, slightly prominent, surrounded by an inflammatory circle, and occurring principally on the face and limbs.

Impetigo sparsa consists of various collections of pustules, which are developed separately on several parts of the body, but especially on the inferior extremities, fore-arm, wrist, and ankle.

It may be either acute or chronic, and may exist with or without disturbance of the digestive functions. It is a disease of much more frequent occurrence in adults than in children; yet authors place among its predisposing causes, the first and second dentition. I have never met with it in infants at the breast; they are, however, greatly subject to various kinds of tenia, and there exists so much resemblance between tenia mucosa and *impetigo sparsa*, that it is difficult to establish a well-defined line of demarcation.

Besides, impetigo, according to Bateman, may follow tenia mucosa, (*Porrigo larvalis*—Willan;) and according to some authors, the shades which are observed between tenia mucosa, and *impetigo sparsa*, result entirely from the different regions in which the pustules are developed, and from the no less remarkable difference of the ages of the individuals affected with the disease.*

* Rayer, *Traité des Maladies de la peau*, 1st vol. p. 479.

Be this as it may, if well marked impetigo is met with in an infant, the plethoric condition should be relieved if it exist, and the gastro-intestinal complications closely watched; the cutaneous inflammation moderated by the use of tepid baths, of simple water, or bran water, by lotions made with marshmallow roots, to which poppy heads or the extract of opium may be added. Finally, Rayer has advised the use of mild ointment of oxide of zinc and acetate of lead, in order to relieve the inflammation. Neither douches nor vapor baths should be used until the inflammatory period is passed. It should not be forgotten that impetigo is developed usually in those children who have been previously much reduced by other chronic cutaneous affections, and that it is often accompanied by a violent itching and great intestinal irritation, arresting their sleep and disturbing their digestive organs, reducing them to marasmus, and exposing them to lymphatic engorgements of the neck and mesentery. It would, no doubt, be proper, under these circumstances, to have recourse to sea-bathing, or baths of Barège water, and to use all other means for the renovation of the general health of the patient.

"TEIGNE FAVEUSE"—PORRIGO LUPINOSA.*

This disease is much more common in children of the age of seven, eight, or nine years, than in those still at the breast; it is usually seated on the scalp, and is communicated by contact and by the use of the same brushes or combs. It may occupy other parts besides the head. I have twice seen it, at the Hospice des Enfants Trouvés, appear on the inferior extremities of very young infants; in one of the two particularly, the peculiar characters of the disease were very strongly marked; it was developed on the posterior and lateral parts of the thighs. This child was three weeks old when it was exposed, so that the affection might easily have been communicated by contact, during its sojourn with its parents. The inflammation and the scabs disappeared at the end of fifteen days, after the use of nothing more than bran baths and emollient lotions. There remained in their

* This disease has been confounded with *Porrigo favosa*, but it is evidently *Porrigo lupinosa* of English authors, as may be seen by comparing the descriptions of them. See Plumbe on the diseases of the skin.—S.

places violet-red spots, which began to fade in about three weeks after the period when the child was sent into the country.

The "teigne faveuse" is developed more frequently in the scalp; to the pustules succeed scabs, which enlarge, mingle together, and form a great number of cup-like hollows, bearing some resemblance to a honey-comb, or to the depressions in a lupin-seed, or to the fructification of certain species of lichen. When the disease has recently appeared, they are either of a yellow or fawn color, but as they grow old they become white, break and detach themselves from the scalp in the pulverulent form.

When the inflammation has continued for some time, the bulbs of the hair become affected, and are altered or destroyed in such a manner as to cause the hair to fall, leaving the skin smooth and white. The surrounding cellular tissue becomes the seat of a chronic abscess, the glands of the neck at the same time swell, and it is not unusual to find the disease complicated with ophthalmia, coryza, and chronic inflammation of the stomach and intestines.

When the pustules and scabs are few in number, and of limited extent, all that is necessary is the application of emollient lotions to the head, together with revulsives to the skin or bowels. For this purpose, the child may take a little manna, or super tartrate of potass, dissolved in whey, and a blister may be applied to one of the arms; the head should, at the same time, be washed with a decoction of poppy-heads, or of marshmallows, or with tepid water; cleanliness is of the greatest importance to prevent the multiplication of pediculi, which are generally produced in great numbers beneath the scabs.

If the pileous follicles have been disorganized by inflammation, the removal of the hairs becomes indispensable; yet it ought to be deferred as long as possible if the infant be very young or feeble; but when age and strength will allow of this treatment, we should not hesitate about using it early in the disease.

The method of treatment adopted by the *frères Mahon*, is the best that can be used for this purpose; it consists—1st, In cleansing the scalp, and preserving it clean by the use of linseed poultices and saponaceous lotions; 2dly, In cautiously and tenderly removing the hair. The following, according to M. Rayer, is the treatment of the *frères Mahon*. The part on which the

disease is developed, is anointed every other day with a depilatory cerate composed of four ounces of lard, and of one powder marked No. 1. The application of this must be continued for the space of one month and a half, or two months, according to the obstinacy of the disease. On the intermediate days, the hair should be combed with a fine-toothed comb, by which it is detached without pain. After using these dressings for fifteen days, a small quantity of depilatory powder, No. 2, is sprinkled through the hair once a week. The following day, the hair on the diseased parts is combed, and the depilatory cerate reapplied; this is continued for a month or six weeks. Another depilatory cerate is then used, consisting of four ounces of lard, and of one powder, No. 3, with which the part is anointed for fifteen days, or more, according to the severity of the disease; after this it is only applied twice a week, until the redness of the skin has disappeared; on the days on which the cerate is not used, the patient's hair should be combed once or twice in twenty-four hours, taking the precaution not to press the comb on the skin.

This method has been attended with great success, and is of very easy application to children at the breast.* M. Rayer has given a remarkable example, the subject of which was a little girl aged three months, affected with tinea of the scalp, treated, on the 14th February, 1826, according to the method of Mahon, and cured on the 9th of May, of the same year. M. Rayer also treated with success a little girl who had been affected with the disease from earliest infancy, and who, at the time of his attendance, had been just weaned. "I shaved the head of this child," says M. Rayer, "and covered it with a flaxseed poultice; the scabs softened and soon became detached; the head was washed every day with a decoction of flaxseed; at the end of four or five days it was perfectly clean; I then applied a blister to each arm, and kept them discharging for three months, and every day washed the head myself with a decoction of flaxseed; I thus obtained a cure of this case of tinea without depilation; the blisters were then permitted gradually to heal."

I think it most rational to attempt the cure of tinea by simple antiphlogistic means, before the adoption of any other course, and not to have recourse to depilation until other measures have

* *Recherches sur la siège et la nature des Teignes*, par Mahon, jeune, 1829.

failed. In every instance we should renounce the use of the pitch cap, still in use in some parts of the country.

TINEA ANNULARIS.

This disease is very rare in sucking children ; it generally appears between the age of two years and puberty. It is evidently contagious, and is one of the most obstinate inflammations of the scalp. The same method of treatment should be adopted for this as for the preceding diseases.

TINEA GRANULATA.

Tenia granulata, the distinctive characters of which have already been described, is of less frequent occurrence than "teigne faveuse," and is rarely to be seen in nursing infants. It is ordinarily accompanied with the same general symptoms, and requires nearly the same treatment as "teigne faveuse."

TINEA MUCOSA—PORRIGO LARVALIS.

This affection is extremely frequent in infants at the breast ; it usually shows itself about the age of three, five, or eight months. It is neither contagious nor dangerous ; and it is very rare to see any of the children die with it. Common people, who are easily led to adopt the theory of a corruption of humors, habitually regard this affection of the scalp as a salutary depuration. Whatever foundation there is for this opinion, it is proved that, during the course of the disease, children rarely exhibit any gastric or thoracic complications, which so often render cutaneous diseases fatal ; and tenia mucosa ordinarily disappears without leaving after it any of those serious affections of the constitution which some individuals experience after certain cutaneous diseases. I have seen a great number of sucking infants affected with tenia mucosa, at the Hospice des Enfants Trouvés ; very few of them perished, but the greater number exhibited, after the disappearance of this inflammation, a state of vigor and embonpoint, which appeared to give some support to the popular opinion just mentioned. However, I am far from thinking that this general assertion admits of no exceptions ; and I believe it possible that the disease may be complicated with an inflammation of the primæ viæ, of greater or less intensity.

It may exist in an acute or chronic state ; may confine its ra-

vages to the scalp, or extend them to the face and neck; may be with or without fever; and may sometimes form small phlegmonous tumors about the ears and surface of the cranium, from which arise the engorgement of the lymphatic glands of the neck. We see it also complicated with aphthæ, angina, ophthalmia, and existing in connexion with other cutaneous phlegmasiæ.

Simple emollient lotions to the inflamed parts, together with small doses of calomel, for the purpose of producing a revulsion on the intestinal canal, constitute the treatment of the acute form of this disease. But if it assume a chronic form, and resist these simple means; and if, by reason of the abundant excretion, the strength of the child be wasted; and if it spread to the face, or to the superior parts of the neck, causing chronic engorgements of the lymphatic glands, it then becomes necessary to employ more energetic measures, such as counter irritants to the skin, drinks rendered slightly tonic, a nourishing diet, sulphurous lotions, saturnine cerate, and ointment of zinc, or of nitrate of mercury, to change the nature of the cutaneous irritation. It is rare that recourse to depilation is necessary, the inflammation seldom attacking the bulbs of the hair, and seldom leaves cicatrices, so superficial is its situation. The different complications, such as ophthalmia, gastro-enteritis, thrush, etc., should be met by appropriate treatment.*

PRURIGO.

Prurigo *mitis*,

“ *formicans*,

“ *senilis*,

“ *infantilis*.

This papular inflammation, characterized by the great itching which it produces, is often complicated with gastro-intestinal inflammation; it is observed both in children and old people, it is,

* Dr. Jemina has published a number of cases showing the complete efficacy of supertartrate of potass in the treatment of tenia mucosa of the face, (*Porrigo larvalis*—Willan,) in nursing infants. This medicine is administered through the medium of the nurse. The usual dose is from one to two drachms in a pound and a half to two pounds of the decoction of dog-grass, (*Triticum repens*,) sweetened. This should be given to the nurse during the day, and repeated daily until a cure is effected. It is specially applicable to those cases which have obstinately resisted all the usual means of treatment. V. *Observations du Docteur Jemina, in the Archives general de medicine*, v. 21, 1829.

however, a little less rare in young infants, and on this account there have been formed two varieties, referring to the age of the individual affected—*prurigo senilis*, and *prurigo infantilis*. It is with the latter only, in this work, that I have any interest, and shall commence by presenting an example of the disease.

CASE VII. In the month of September, 1826, a little girl, aged about six or seven months, was brought to the Hospice des Enfants Trouvés. She was pale, emaciated, and affected with a copious diarrhœa, and a slight ophthalmia. The filthy and ragged condition of the clothes, with the general appearance of wretchedness, denoted the extreme poverty in which she had lived; she cried almost constantly, seized the breast with the utmost eagerness, and did not enjoy a moment's repose; upon the face, neck, and fore-arms, there were a great number of small, slightly prominent papulæ, torn and bloody, or covered with black crusts formed no doubt by the desiccation of the blood. The legs and body also presented small papulæ, much more evident to the touch than to the sight; but these parts being covered, and the child on this account not being able to scratch them, they were not at all torn. Besides this, there were marks over the whole body of innumerable flea-bites, so that this little child appeared to have been for a long time a prey to the two-fold pain caused by the violence of the disease, and the bites of the insects by which she was devoured.

This child was immersed in a decoction of marshmallows, and the limbs and body anointed with oil of sweet almonds, carefully covering up the hands and arms. Rice water, sweetened with the syrup of marshmallows, was administered internally, and milk and water was given for nourishment.

The pain, cries, and wakefulness lasted for some days, but the cutaneous irritation having been at last allayed, the child became more calm, the functions of digestion were soon restored, sleep returned, and at the end of fifteen days no other traces of the disease remained, than a few violet spots on the neck and superior extremities. Three weeks after, when the strength had already begun to return, the child was returned to the parents, at whose residence no doubt there still existed the causes which had produced the disease, and to a return of which she was inevitably exposed by their extreme wretchedness.

Thus poverty and filth may become a cause of prurigo in young infants. It may be local or general, simple, or complica-

ted with another affection of the skin, but particularly with lichen or psora.

In general prurigo, emollient, saponaceous or sulphurous baths, demulcent or slightly acidulated drinks, constitute the treatment. In local prurigo, it will be necessary to apply emollient, sulphurous, or alkaline lotions alternately to the diseased parts. Gelatino-sulphurous douches have been employed with success. The greatest care should be used to accomplish the early removal of the prurigo that is developed around the vulva or anus in children advanced in age, because the excessive itching of these parts compelling the child to scratch them constantly, they may thereby continue in a state of erythism and irritation, extremely prejudicial to their health.

The works of MM. Alibert, Mouronval, and Rayer, on cutaneous diseases, may be consulted with advantage for detailed accounts of prurigo.

STROPHULUS.

Strophulus intertinctus,

“ *albidus,*

“ *confertus,*

“ *volaticus,*

“ *candidus.*

Strophulus is a very common disease in sucking children ; it exhibits several varieties, on which I shall offer some remarks. I refer particularly to those which Bateman has described, under the names *candidus* and *albidus*.

Strophulus *candidus*, which, according to the English pathologist, consists of medium-sized pimples, having a smooth and shining surface, and of a lighter color than the surrounding skin, is seen upon the shoulders and arms at the same time that porri-go *larvalis* affects the face. I have twice seen an eruption of this species ; it occurred once in a little girl of five months, and occupied the neck and arms ; she was at the same time affected with tenia mucosa and gastro-enteritis. She died, and upon dissecting the pimple, and examining it carefully, I discovered that it enclosed a small quantity of puriform matter. There were three pimples of this kind on the right arm, and two on the neck ;

each of them presented the same phenomenon. In a little boy, aged fifteen days, two pimples, large, hard, and of a white appearance, were developed on the face without any known cause; he remained eight days in this condition; at the end of which time, the pellicle that covered them softened, became broken, and the pimples were replaced by small yellow scales, which soon fell off, leaving the skin they had covered of a violet color.

From these considerations, we are led to believe that *strophulus candidus* is not, properly speaking, a papular but a pustular disease, which can be referred to a particular species of pustules existing at the same time on other parts of the body of the child.

As to *strophulus albidus*, it has not been in my power to make the same observations in relation to it; but as it scarcely differs from the former except in the red circle that surrounds the base, the same remarks, I think, are applicable to this disease.

With regard to the other varieties, the same remark does not apply, they all preserve the distinctive marks of their species; they consist of small pimples of a red color, more or less deep, slightly prominent, grouped or scattered over the face, body, and limbs, and are described by authors in various treatises on diseases of children, by the vague terms of "boutons," "rougeurs," "élevures," "feux de dents," etc.

Strophulus intertinctus is known by the existence of bright red pimples, disseminated over the face, limbs, or hands, with erythematic patches between them.

Strophulus confertus consists in a large number of pimples, more or less approximated, of variable diameter, imparting to the body, by their re-union and their number, a red tint, more or less deep.

Strophulus volaticus is, without contradiction, the most frequent in children; yet it is sometimes seen in adults;* in the summer, particularly, it prevails among the children nursed at the Hospice des Enfants Trouvés. It consists of small circular pimples, grouped on the cheeks and body, which, upon disappearing, are replaced by other pimples, themselves in turn un-

* I once knew a lady, 32 years of age, affected with a chronic disorder of the digestive organs, on whose arms and hands a number of pimples of *strophulus volaticus* appeared every time the symptoms of inflammation became exasperated.

dergoing the same change. This eruption often continues several weeks.

Bateman, I think, has greatly exaggerated the complications of strophulus: it is true that it is sometimes accompanied with gastritis, or gastro-enteritis, but more frequently they either do not exist, or the symptoms are very light; and among the children I have seen with strophulus at the Hospice des Enfants Trouvés, there was but a very small number with sufficient disease to allow of their admission to the infirmary.

Yet as strophulus often appears at the period of dentition, when a great number of infantile diseases are developed, it is not surprising that symptoms of intestinal disorder have been at the same time observed.

Strophulus for itself requires no treatment; the complications, however, should be met by means applicable to each of them.

LICHEN.

- Lichen *simplex*,
- “ *pilaris*,
- “ *circumscriptus*,
- “ *agrius*,
- “ *lividus*,
- “ *urticatus*,
- “ *tropicus*.

Lichen is a disease of more frequent occurrence in children of the age of eight or nine years, and in adults, than in children at the breast; I have never yet seen any case of it in the latter. In every instance, this affection can be recognized by the characters which it preserves in all its varieties.

Lichen *simplex* consists of small pimples developed on the face and arms, accompanied, on the first appearance, with fever, and often succeeded by exfoliations of a pulverulent kind. According to Lorry, it may re-appear anew in the same individual every summer.

In lichen *pilaris* the pimples show themselves at the roots of the hairs of the skin.

Patches, or the union of pimples, in a circular form, characterize lichen *circumscriptus*.

Lichen *agrius*, one of the most serious from its complications,

and especially from the febrile state with which it is accompanied, manifests itself under the form of large red, highly inflamed, and painful pimples; they soon become excoriated, and are covered with scabs, bearing some resemblance to impetigo.

Lichen *lividus* is known by the livid color of the pimples and the petechiæ mixed with them. Lichen *urticatus* is remarkable for the resemblance which the pimples bear to the marks left by the pricking of nettles; and Bateman has included under the name of lichen *tropicus*, the eruptions produced by the influence of a tropical climate.

Emollient baths, during the inflammatory stage of lichen, sulphurous baths and saturnine lotions, acidulated drinks, sulphuric lemonade, towards the termination of the disease; finally, the removal from the atmospheric causes producing lichen, should form the base of the treatment. For further details of treatment, the works of Bateman, Alibert, and Rayer, may be consulted.

CANCER—LUPUS—ELEPHANTIASIS.

Cancer, lupus, and Greek elephantiasis, are not properly infantile diseases: their history will be found in works of general pathology.

LEPRA.

Lepra vulgaris,
 “ *alphoides*,
 “ *negricans*.

I do not believe that lepra has been observed in infants at the breast. M. Baron, whose experience ought to be authority, has never seen it at the Hospice des Enfants Trouvés; and Rayer says he never met with it in young infants. But this remark is not applicable after the first dentition, for the different varieties have been often seen at the Hospice des Enfants Malade. For the history of this disease, the work of Alibert, and the excellent chapter of Rayer on this subject, may be consulted.

PSORIASIS.

Psoriasis guttata,
 “ *diffusa*,
 “ *gyrata*,
 “ *inveterata*.

Psoriasis may attack children at the breast; besides, it is one of those cutaneous diseases which are evidently hereditary. It has often been described under the name of "dartre squameuse," or confounded with lepra; it has also sometimes been mistaken for syphilitic pustules. These mistakes may be avoided by paying attention to the anatomical characters appertaining to this disease, and which we have endeavored to exhibit in the preceding tables.

Psoriasis *guttata* consists in small squamous patches covering small solid elevations, red, and of the size of a pin's head, the summits of which are soon covered with little, dry, white scales. The centre of each of these patches is always more elevated than the borders; the intervals which separate them are of various extent, and they are surrounded by an inflammatory circle. When the patches are elongated in a spiral form, they are denominated psoriasis *gyrata*. If the patches increase in number, spread, and mingle, it is then denominated psoriasis *diffusa*. When the squamous inflammation continues several months or several years, it receives the name of *inveterata*; formerly the appellation of *agria* was given to this variety; and as the skin then assumes an appearance analogous to the bark of trees, covered with lichens, Alibert has described this disease under the name of "*dartre squameuse lichénoïde*."

Psoriasis may be developed on the scalp, face, about the eyes, (*psorophthalmia*,) around the lips, on the trunk, scrotum, prepuce, hands, feet, or other parts of the limbs.

Children can be affected with psoriasis from the age of two months to two years, which, according to Bateman, has induced Willan to make a distinct species called psoriasis *infantilis*. The following case will furnish an instance of this species.

CASE VIII.—Joseph, aged three months, was suckled for two months and a half at the Hospice des Enfants Trouvés; he was thin, pale, and miserably wretched; and had been frequently affected with diarrhœa, and sometimes vomited the milk shortly after sucking. He was sent to the infirmary on the 25th of May, 1826, for a cutaneous affection of ten days standing; this affection consisted in a gray scaly patch, irregular in its form, three lines in breadth, and half an inch in length, between the chin and lower lip. This scale was superficial, and surrounded by a small red circle, and had begun to

crack in the centre. There also existed two others, much longer, but not less irregular, on the internal portion of the right fore-arm; there was a third, about the size of a two franc piece, on the left hip. These scales were slightly salient, and their borders surrounded by a bright red line, resembling the colored lines used to designate the limits of a country on a map.

The child was weaned; milk and water sweetened were given for drink, and every morning he was immersed for half an hour in a bran bath.

Sleeplessness, pain, manifested by his cries, his progressive emaciation, and the continued diarrhœa, hastened the approach of death. On the eighth day after his entrance into the infirmary, he succumbed; when the scales detached were no longer reproduced, leaving the skin covered with small slightly projecting pimples, and of a violet color, on the places which had been covered with the scales. A violent inflammation of the colon was discovered on examining the body. All the other organs were in a healthy state.

The treatment of psoriasis should be more or less active, in proportion to the recent invasion or long continuance of the disease; in the former case it will be sufficient to use emollient applications, either by effusion or bathing, until the irritation of the skin is relieved, and the scabs, which form without ceasing on the inflammatory parts, are removed. In the latter case, the chronic inflammation of the integuments should be first attended to; and afterwards, the actual condition of the constitution of the patient.

To accomplish the first object, emollient and narcotic baths have been recommended; and for the second, internal remedies have been highly extolled, such as epsom salts, subcarbonate of potass, calomel, resin of jalap, tincture of cantuarides, arsenical preparations continued for several months; this method appears to us an irrational one, and M. Rayer has offered the following remarks in relation to it. "To submit a patient, affected with obstinate psoriasis, to arsenical treatment, in the faint hope of producing a transient relief, is certainly to expose him to the fatal effects of disease in the internal organs, which are much more irritable than the skin." It is much better to attempt some constitutional treatment in children with psoriasis; by changing their nurses, climate, or habitation; and by attending to cleanli-

ness, together with the prudent adoption of such measures as will meet the pathological condition of the digestive organs.

PITYRIASIS.

Pityriasis must not be confounded with dandrif, so often observed in young children. It consists of a very slight inflammation of the skin, accompanied and followed by a furfuraceous exfoliation of the epidermis. It may be seen on the head and on different parts of the body. It is, properly speaking, nothing more than a termination of erythematic, erysipelatous, or lichenoid inflammation; and I am surprised that pathologists, and Bateman in particular, have described, as connected with this species of inflammation, several varieties which are much more closely allied to other diseases than to that now under consideration, and with which they have nothing in common, except the exfoliation of the epidermis.

Pityriasis occurs on the head, eyebrows, arms, trunk, and legs. The cutaneous inflammation is so trifling, that it ought rather to be placed among the alterations of the epidermis, than among inflammations of the skin; and I only place it here in accordance with the order established by authors whose names give authority in science. Cleanliness appears to me all that is necessary in the treatment of pityriasis, at least when it is not caused by some more serious cutaneous affection, such as erysipelas or lichen.

FISSURES—CHAFING.

This affection is developed in young children in the folds of the articulations, especially in the groin. The part should be sprinkled with powdered lycopodium or starch. Powders of the white oxide of lead should be avoided, because, as Gardien remarks, children may experience effects analogous to painters' cholic. Plenck and Professor Chaussier, have made similar observations. If the disorder resist the usual method of preserving cleanliness, emollient lotions, and the application of the powder spoken of above, the ointment recommended by Rouen may then be used:

Rx Cerati simplicis, ℥ss.
Pulveris Lycopodii,
Oxidi Zinci, āā, 3j.

The operation of this ointment may change the chronic and indolent character which this disease sometimes assumes.

It should not be confounded with the fissures observed on the body during the exfoliation of the epidermis.

GANGRENE OF NEW-BORN CHILDREN.

By the term *gangrene of new-born children*, I understand a variety of gangrenous inflammations, which is particularly observed in the earlier period of life, in those infants in whom the respiratory and circulatory functions are imperfectly executed, producing a very evident sanguineous congestion of the extremities, which become purple and cold, and soon shrink, dry, decompose, and sphacelate, until an inflammatory circle forming, bounds the ravages of the gangrene, analogous to the gangrene of old people—or until death terminates this disorganization of the integuments.

The gangrene ordinarily commences in the fingers or toes; and it sometimes shows itself on the arms and legs. The skin around the nails assumes a violet color, and tumefies; afterwards it shrinks, wrinkles, or is covered with small blisters containing a sanguineous fluid. This fluid soon flows out, and a livid excoriation appears in the place of the blisters; the integuments become emphysematous and assume a brown appearance, diffusing the well known gangrenous odor. During this time the child is almost without motion, is insensible, and scarcely respires; the cry is smothered and plaintive, and he gradually sinks; the abdomen first becoming tympanitic, and the different parts of the body œdematous, while scorbutic petechiæ appear upon the body and limbs.

Underwood appears to have confounded this gangrenous inflammation with erysipelas. In relation to this latter disease, he observes: "In a few instances the disease has been attended with some varieties. Infants have not only come into the world with several hard inflammatory patches, and ichorous blisters about the thighs and belly, but with other spots already in a state of mortification. A slough soon spreads to two or three inches in length along the edges of the skin, with smaller ones about other parts of the legs, and on several of the toes and fingers."

I believe that there really exists a difference between ordinary

erysipelatous inflammation and the gangrene of the skin, which is now under consideration. In this case it is not by excess of inflammation that gangrene occurs, but it is in consequence of a great disturbance in the capillary circulation, and to the retarded circulation of slightly oxygenated blood in the subcutaneous tissue, the inevitable result of which is a shrinking and gangrenous degeneration of the integuments.

In all the children exhibiting this livid color of the extremities, this œdematous tumefaction, together with this spontaneous gangrene of the skin, if we may so speak, I have found the lungs crepitating but little, but they were always gorged with blood, which also filled the right cavities of the heart, and the whole venous system; and, penetrating and engorging all the organs, produced thereby a disposition to disorganization.

The object in the treatment ought to be to diminish the sanguineous congestion by the application of leeches, either to the arms or to the armpits, and to promote the capillary circulation by the use of dry or aromatic frictions to the surface of the body. When the gangrene is formed, lotion of cinchona wine, or Virginia snake-root, ought to be applied to the ulcers or sloughs. But what efficacy can we expect from the internal administration of cordials in young children, the delicacy and irritability of whose organs naturally contra-indicate these remedies, and whose stomachs are very often either actually inflamed, or are in a condition to be easily excited to inflammation? Underwood mentions that Dr. Wolsmon, having opened the bodies of two children who had died of erysipelas, found the membranes of the stomach possessing so little consistency, that the least effort was sufficient to detach some portion.

MALIGNANT PUSTULE—CARBUNCLE.

Infants at the breast may, without doubt, be affected with malignant pustule, or with carbuncle; but these diseases are extremely rare at this period of life; should they occur, they ought to be met by the usual energetic means advised in such cases.

BURNS—CHILBLAINS.

The history of burns and chilblains in new-born and nursing infants, requires no particular consideration, as they do not differ

from the same affection occurring in adults; I shall, therefore, dispense with entering on the examination of this subject, which can be found in all works of general pathology.

DISEASES OF THE APPENDAGES OF THE SKIN.

I shall here speak only of ichthyosis, of the alterations of the cutaneous follicles, and of the puriform secretion of the skin.

Ichthyosis is an affection of the epidermis, appearing under the form of patches separated from each other by irregular lines of little depth. These epidermic patches are generally of a dirty gray; they become detached, and upon separating, leave beneath them the epidermis thickened and a little rough to the touch. This disease is usually congenital. It lasts sometimes for years, and is either partial or general in its extent.

Ichthyosis of young infants ought not to be confounded with the epidermic exfoliation of which we have spoken, and which occurs a few days after birth. The thickness of the epidermic laminae, their continual renewal, the persistence of the disease beyond the ordinary term of epidermic exfoliation, and, finally, the form and appearance of the lamellae, are the diagnostic signs of these two pathological conditions. The treatment of ichthyosis in young infants, ought to consist of tepid and emollient baths, gentle frictions with oil of sweet almonds or olive oil, acidulated drinks, and strict attention to cleanliness. Time will effect more in the cure of this disease than remedies; still, it is well known that it often continues for a very long time, and does not disappear even in advanced age.

Cutaneous follicles.—The follicles of the skin in young infants are very much developed. Their disposition, situation, and their relation to the other parts of the skin, have been well described in a memoir by E. H. Weber, inserted in the number of the *Journal Complémentaire du Dictionnaire des Sciences Médicales*, for December, 1827. These follicles, quite prominent on the face and scrotum, are subject to engorgements and swelling, and form a projection, which is usually black in the centre, denominated by some pathologists "*crinons*."* When these projections are pressed, a small quantity of thickened matter issues, of

* Gardien, t. 4, p. 135.

a black color, which may be taken for worms, but which is the result of the disorganization of the follicle. This disease, generally of little extent, disappears with age, and requires no treatment. Yet, if there exists a number of these tumefied follicles, as they often cause a violent itching, it would be well to apply emollient lotions to the skin, and to extract by pressure, or by means of a needle, the dead cellular substance contained in the little follicular tumor.

The puriform oozing occurring on various parts of the skin of children, and particularly behind the ears, is an alteration in the secretion of the derma; the surface of which, deprived of its epidermis, continually pours out a fluid, which concretes in the form of yellow scales. This discharge is usually favorable to the health of the child; for experience has shown, that when it is suddenly suppressed, the most serious effects will often follow, such as encephalitis, ophthalmia, etc. In the treatment, we should confine ourselves to the preservation of cleanliness, and by the application of linen or fine lint, or the leaves of the white beet.

DISEASES OF THE CELLULAR TISSUE.

The diseases of the cellular tissue are divided into inflammation, and serous infiltration. It may, besides, be the seat of sanguineous effusion, or of infiltration, either at the parts that have been compressed, or at points which have not been exposed to pressure; in the latter case, the blood is found effused by a true sanguineous exhalation, a phenomenon of very common occurrence, as we shall see in those cases where respiration and circulation are established with difficulty.

ART. 1.—Inflammation of the Cellular Tissue.

Phlegmon and anthrax are usually seated in the subcutaneous cellular tissue; the former is of common occurrence in children at the breast. It sometimes produces an extensive destruction of the skin. I once saw an infant, aged two months and a half, in whom the lateral portion of the skin of the right breast was destroyed to a great extent, in consequence of phlegmonous inflammation causing so abundant a suppuration, that rapid sinking and death were the consequence.

Indolent abscesses are also very common diseases in young children. They show themselves especially on the limbs; and when they ulcerate, their hard, violet-colored, and undermined borders, present an appearance so much resembling venereal sores, that they have often been regarded as such.

Simple antiphlogistic treatment for acute phlegmonous abscesses, the use of slightly stimulating topical applications, gentle compression, escharotics, alkaline or aluminous lotions for those that are chronic and indolent, are the proper remedies; they should be used with great precaution, and according to the rules laid down in surgical works on the subject of these affections. It should be particularly noted, whether these abscesses are not symptomatic of some other remote disorder.

Œdema or serous inflammation of the cellular tissue in young infants, deserves to be studied with minute attention; we shall, therefore, devote an extended space to its history.

ART. 2.—Œdema, or Induration of the Cellular Tissue of New-born Children.

The hard or indurated state in which a child is sometimes found, is manifested by a swelling of the limbs or face, which are more or less colored, and their firm resistance to the touch, analogous to what is experienced on pressing a hard and compact body. The sensation, therefore, produced by touching, gave rise at first to the expression, induration of the cellular tissue. Anatomical examinations, however, have proved the vagueness of such expressions, and the denomination, compact œdema, has been proposed in the place of induration. Some physicians have recently observed, that induration of the cellular tissue offers two varieties: 1st, That of the cellular tissue, properly so called; 2dly, That of the adipose tissue, (*Dugès, Denis.*) In the establishment of this variety, there is an evident proof of the progress of our knowledge of this disease.

According to Andry and Auvity, from the cells of the indurated cellular tissue a large quantity of serum escapes, when an incision is made and the tumor pressed. But if we fix our attention on the cellular tissue, properly so called, besides the serum with which it is distended, does it exhibit a hardness resembling that

of sclerotic or schirrous affections, or of callous tumors? No; on the contrary, it preserves all its elasticity, suppleness and cellulosity; its fibres have not undergone any organic transformation, but still preserve their reticulated condition; but as they are considerably distended with serum, and as the whole cellular membrane of the body and limbs is filled with fluid, it necessarily results that the cellular tissue is hard to the touch; but this hardness does not really exist in this tissue, which has undergone no other change than that of mechanical distension: in a word, this induration has no existence except in our sensations. The same phenomenon occurs when a bladder is filled with water, mercury, or even with air. If it be completely distended with them, it offers to the touch a hardness in which its tissue has no participation; for, if one third or one half of the substance be removed, the bladder then becomes soft and flaccid. The same occurs in the induration of the cellular tissue of new-born children. It increases in hardness in proportion to the accumulation of serum.

Thus, then, strictly speaking, there is no induration of the cellular tissue in the disease designated by this title. Modern authors who have retained this name, are certainly to be blamed, and much more those who have proposed that of "sclérème," to which term is very naturally attached the idea of a transformation of the cellular tissue, which does not really exist.

I have said that the apparent induration of the limbs of a fœtus may be seated either in the cellular or adipose tissue. When the hardness of the integuments is owing to a serous infiltration of the cellular tissue, the limbs are swelled, or at least increased, in size. The violet color of the integuments indicates a sanguineous congestion of those parts; the irregularity of the pulse, and the difficulty of respiration, are evident signs of a superabundance of blood in the heart, lungs, and large vessels.

Induration of the adipose tissue exists with or without general infiltration of the subcutaneous cellular tissue: it is usually seated in the cheeks, nates, calves, or back; and occurs both with or without derangement of the circulation or respiration. It usually appears when the child is *in articulo mortis*; and I have often seen it developed after death on the dead body of children that had suddenly died. If the adipose tissue be then

examined, it will be found firm and hard, like tallow, and entirely congealed; resembling the fat of animals killed in the slaughter-houses. It can be easily conceived that the adipose tissue may also, under some circumstances, congeal in the same manner even during life, if from some cause the animal heat should cease to exist.

Does the infiltration of the cellular tissue, which in young infants produces the apparent induration of their limbs, differ from that which sometimes occurs in adults? The solution of this question appears to me of much importance.

M. Breschet, regarding this œdema as peculiar in its nature, has had recourse, in order to establish the truth, to the assistance of one of our most celebrated chymists, who undertook to ascertain the condition of the serous infiltrations in the cellular tissue of children thus affected. M. Chevreul gives the result of his experiments in the following language:

"I have already established the fact, that in the icterous affection accompanying the induration of the cellular tissue in newborn children, the blood is diseased; it has two coloring substances not found in the blood of healthy children, or if they are found, are in very small quantities; besides, there exists also an ingredient which imparts to the serum when separated from the fibrin, the property of spontaneous coagulation. The coloring principles explain the color of the cellular tissue; and the spontaneously coagulable matter explains the induration of the cellular tissue, if it were demonstrated that this matter does not exist in the blood of healthy children, or that it is found in very small quantities, and also if it can coagulate in the cellular tissue, as it coagulates in the serum drawn from the bodies of those children who have died from induration."*

The reading of this paragraph gave rise to the following reflections. M. Breschet has considered icterus and induration of the cellular tissue as one and the same disease; he has only presented to M. Chevreul's notice such infants as have at the same time been affected with induration and icterus, and it is to the yellow serum alone that this chymist has particularly directed

* Chevreul, *considérations général sur l'analyse organique et sur ses applications*. Paris, 1824, p. 218.

his attention. There also exists, in the language of M. Chevreul, a kind of uncertainty or philosophical doubt, arising from the severity and impartiality of his judgment. He has not laid down the principle, that the induration of the cellular tissue is attributable to the principle of spontaneous coagulation of the serum; but he has well expressed the uncertainty of his inferences by observing that such would be the course of the induration, if it had been shown that this matter did not exist in the blood of healthy children; and also that it might coagulate in the cellular tissue, as it coagulates in the serum drawn from the bodies of children who have died from induration.

General infiltration of the integuments must not be confounded with icterus, because one exists without the other; yet both these phenomena also may exist together. The serosity, therefore, must be considered as independent of the coloring matter which it sometimes contains.

I placed in a vessel, as M. Chevreul had previously done, a small quantity of serosity, drawn from the cellular tissue of a child, œdematous and affected with induration, and observed that it coagulated spontaneously. After having established this fact, I was desirous of ascertaining whether serosity taken from the cellular tissue of a child in good health, would likewise coagulate; the same phenomenon occurred. I placed in two different vessels, serosity taken from the cellular tissue of a child whose integuments were indurated, and from one in whom they had undergone no change. Coagulation was effected in both in nearly the same time. This double experiment was made with yellow serum, taken from an icterous subject, and on the same fluid taken from one not so affected; the same result occurred in both. I drew the serosity from the cellular tissue of the feet of a child a year old, who had died of gastro-enteritis, who was reduced to marasmus, and whose legs alone were œdematous; the fluid, after remaining at rest for half an hour, became thickened: and I have also seen the serosity taken from the dead body of an adult, who had died of an affection of the heart, coagulate at the end of six hours. Hence, is not this spontaneous coagulation an inherent property of the fluid, causing the induration of the cellular tissue? Consequently, the first condi-

tion required by M. Chevreul for the explanation of the indurated state of the cellular tissue, according to M. Breschet's theory, has not been fulfilled. Let us see if the second is better, or, in other words, let us see if the matter of the spontaneous coagulation of the serum, can coagulate in the cellular tissue.

Heat and rest hastened the coagulation of the serosity deposited in one of the vessels. If the liquid already thickened were shaken, it soon returned to its fluid state. Now, we cannot conceive of the serosity being in such a state of immobility in the middle of the cellular tissue, as to allow of its coagulation; on the other hand, the temperature of indurated children is usually quite low; consequently, neither immobility nor heat, both favorable to the coagulation of serum drawn from the cellular tissue, exist in the cellular tissue of young infants.

There is still another manner of proving that this condensation does not occur in the cellular tissue. If an incision be made in the infiltrated limbs of a child, the slightest pressure will cause abundant drops of liquid serosity to flow out. When it has flowed in this manner, the cellular tissue, heretofore engorged, distended, and hardened, returns to its softened condition, and the relieved limbs are no longer hard. I repeated this experiment with success before M. Chevreul, on a fœtus both icterous and indurated, the body of which presented all the characters of those on which this celebrated chymist had made his first researches. Besides, I suspended during one night, by the head, the body of an indurated infant, making a number of incisions in the legs. On the following day these parts were covered with serum, which flowed from the incisions and appeared on the limbs like dew. Now the serosity could in no way have obeyed the laws of gravity, and would not have flowed thus freely, if it had been congealed in the midst of the cellular tissue.

It results, from these considerations, and from the preceding facts, that the induration of the cellular tissue of young infants, is nothing more than simple œdema, analogous to that which occurs in adults and old people affected with diseases of the lungs, heart, and large vessels. It is known that the infiltrated limbs sometimes possess a hardness equal to that of the limbs of a young infant. The redness of the skin in children depends on the constant state of congestion in which it is found

It remains for us to examine what are the causes which produce œdema in young children. Authors have explained them in different ways. It is useless to consider the singular idea of Uzembezius, that the sight of marble statuary might influence mothers during pregnancy, and extend to their offspring. Neither shall we stop to consider the tanning property of the *liquor amnii*; but it is of greater importance to consider more natural explanations.

Andry and Auvity have regarded the action of cold as one of the principal causes of induration of young infants; this agent interrupts the insensible transpiration, retards the circulation, and condenses the mucous and serous fluids in the tissues. We shall see of what degree of confidence this opinion is worthy. M. Troccon has controverted it, and has asserted that cold usually has the effect of increasing instead of retarding the circulation. Most authors, and Hulme in particular, have insisted on the co-existence of a state of congestion or inflammation of the lungs, with induration of the cellular tissue, and have pointed out in this case the passive congestion of the heart and large vessels. Underwood has vaguely ascribed it to the influence of unhealthy air; whilst Baumes attributes the induration to the rigidity of the muscles, considering an attendant symptom as the end of the disease. Palletta ascribes this disease in part to the agency of the liver. Breschet regards it as the result of an accumulation of serum separated from the blood, and as a disease dependent on the imperfect closure of the foramen ovale. Leger appears disposed to admit, as one of the causes of the induration, the slight development of the intestinal canal, which is about three feet or less in length, in children with this disease. M. Denis, who has attached extraordinary importance to this disease, has gone still farther than his predecessors in search of its cause, for he regards it as true phlegmasia, a sympathetic and consecutive irritation of the gastro-intestinal apparatus, which he calls "*phlegmasie entero-cellulaire*." I cannot assent to this notion, and he has exposed himself to the charge of having made a forced application of the principles of the new medical doctrines. Lastly, M. Baron has, for a long time, regarded it as an œdema,—a simple serous infiltration of the cellular tissue, and symptomatic of a derangement or obstruction either in the heart, lungs, or large vessels.

Such are the most remarkable opinions which have been entertained with reference to the causes of the induration of the cellular tissue. I shall now submit them to the test of experiment. I shall report and comment on a number of facts, from the study of which I will draw conclusions which may enable us to decide what are the proper causes, and what the nature and treatment of this affection. It is the only method of clearing up an obscure subject; for in a science of observation, man ought, if I may be allowed the expression, to conceal himself behind the facts which alone give force to his opinions and guaranty their correctness.

In the year 1826, there entered the Hospice des Enfants Trouvés of Paris, 5,392 children; 1404 of this number died either in the surgical or medical infirmary, or at the "Crèche;"* in the medical infirmary under the care of M. Baron, 777 were received. The number of children affected with œdema, or induration of the cellular tissue, either in the medical infirmary or at the "Crèche," was 240. This number will be found divided as follows, according to the different months in the year; the number of patients in the infirmary was always from 30 to 32.

January,	. . . . .	15
February,	. . . . .	15
March,	. . . . .	16
April,	. . . . .	18
May,	. . . . .	22
June,	. . . . .	3
July,	. . . . .	4
August,	. . . . .	14
September,	. . . . .	10
October,	. . . . .	16
November,	. . . . .	29
December,	. . . . .	15
Indurated children not treated in the infirmary,		63
Total		240

According to this statement, it is evident that œdema does not

* This name is given to the apartment where infants are deposited on their arrival.

affect young infants only during the winter; consequently the explanation given by Auvity of this disease, that it is the result of the condensation of the serous fluid by cold, is invalidated by the exposition just given. If we compare the entire number of infants affected with induration, or œdema, during the summer months, with the number attacked with it in the winter, it will be seen that the difference does no amount to one half, and that but a single inference can be drawn from this calculation,—that is, that the disease is more frequent in winter than in summer; thus, during the months of January, February, November, and December, seventy-four indurated or œdematous infants entered the infirmary, and forty-three during the months of May, June, July, and August. Let us add to the preceding remarks, that diseases are, in general, more frequent in winter than in summer, and consequently it is not surprising that the induration of the cellular tissue is more often manifested in the one season rather than in the other.

Before endeavoring to ascertain what are the organs most often affected during the existence of this disease, or after its cessation, let us study it with reference to its seat, its invasion, and its progress.

Almost all the children that are the subjects of these remarks, were of the age of one to eight days; some were just born, and appeared to have brought this disease with them from the womb. This fact has also been mentioned by those physicians who have written on this subject. In almost all, the skin still retained the peculiar red color of new-born children. In nearly all, the epidermic exfoliation had not commenced, or had but just commenced at the time of the development of œdema. The œdematous disease was not present in the same degree in all the subjects; the induration appeared successively on the feet, hands, limbs, pubic region, back, and face, of some; while every part of the body was affected in others, in a very violent degree. It is extremely common to meet local induration or œdema. I have several times seen this affection develop itself some days after admission to the infirmary. The induration of the adipose tissue is sometimes united with œdema of the cellular tissue; most generally the first exists without the second. The progress of the disease is very irregular; it presents no fixed period;—no

particular phenomenon announces its resolution ; and its degrees of intensity, the only phenomenon worthy of observation, offer in their progress and in their decrease, the greatest, but, at the same time, the least, appreciable variety. In general œdema, the serum is not only infiltrated through the cellular tissue, but is also effused in other parts of the body. I have often met with it in the sub-peritoneal cellular tissue, in the cavity of the mediastinum and in the plexus choroides.

Of all the phenomena accompanying œdema of infants, icterus is one of the most common. In seventy-seven infants affected with œdema, I observed thirty with jaundice ; but did not find among them any organic lesion that could account for this difference. I shall not extend my observations to the causes which appear to produce jaundice in young infants, this being an incidental question deserving more particular consideration ; let it suffice to remark, that one of these diseases may exist without the other ; that it is neither the cause nor effect of the other, and consequently they ought not to be placed together in nosological arrangement.

It is important to know how far hepatic derangements may influence the production of œdema ; the following exhibits the result of my observations on this subject. In ninety indurated children, on a *post mortem* examination made with great care, the liver exhibited no alteration, except in twenty instances ; there were ten with considerable sanguineous congestion of this organ ; the blood with which it was filled was found black and fluid ; the large abdominal vessels were equally engorged, and the body itself was in a state of general congestion. In five, the liver was friable and very much engorged ; the bile thick and almost concrete. In four others, the liver was of a slate color, firm, and resisted the cutting of the scalpel ; and in the last of the number, there existed peritonitis, a congestion of the liver, and a sero-sanguinolent effusion in the abdomen. It cannot be inferred from these facts that the sanguineous congestion, the friability or inflammation of the peritoneal coat, or even of the liver itself, are the ordinary causes of œdema of the cellular tissue ; for I have met with a great number of children presenting these alterations in whom induration did not exist, and many others where the cellular tissue was infiltrated with serosity, in whom

the *post mortem* examination did not result in the discovery of the alteration I have pointed out.

Inflammation or congestion of the lungs has been regarded as a cause of the affection which we are now considering; and wishing to ascertain, by facts, the truth of this assertion, I examined the state of the lungs in the seventy-seven œdematous infants already mentioned while speaking of icterus: in forty-three of these, the lungs were perfectly sound; the remaining thirty-four presented the respiratory apparatus in a pathological condition more or less serious. In twelve of these, there existed a pulmonary congestion; in six, complete hepatization, four of them in the right, and two in the left lung; in three, there was pleuropneumonia, and in the others, simple passive congestion at the posterior borders of the lungs, and particularly in the right lung. It is sufficient that there exist examples of induration or œdema of the cellular tissue of young infants, without pneumonia or pulmonary congestion, to be satisfied of the little influence that the latter disease exercises in the production of serous infiltration of the cellular tissue, and to make us call in question the truth of M. Hulme's assertion.

I shall now examine the opinion of M. Breschet, who regards the induration of the cellular tissue as depending upon the continuation of the foramen ovale. In seventy-seven children mentioned above, forty presented the foramen completely closed; in twenty-eight of these, the ductus arteriosus was considerably narrowed, and the blood could not pass through it. The theory of M. Breschet, therefore, falls before the evidence of these facts. If the foramen ovale be found still open in indurated infants, it is, that inasmuch as induration of the cellular tissue affects particularly very young infants, the changes which take place in the heart and ductus arteriosus of new-born children, after the establishment of the independent circulation, have not had time to occur before the development of œdema. I believe, therefore, that there exists no relation between these two phenomena.

I have also measured the intestines, to ascertain the correctness of the fact advanced by M. Théodore Léger, who found them in children affected with this disease much shorter than in others. I have observed nothing that has any resemblance of the fact,

either because I may have carelessly conducted my observations, or that chance, which seems to have aided M. Léger, has not led me to the same result. Besides, this point in the history of the induration of the cellular tissue appears to me of little importance, for it is difficult to conceive what relation of cause and effect can exist between these two states of organization.

If our opinions are to be supported only by the number of facts, and if we are not to avail ourselves of the advantages afforded by our judgment and experience, in commenting on these facts, I should be inclined to think, with M. Denis, that one of the most common affections that accompany induration of the cellular tissue is gastro-enteritis, and to admit the union which he has attempted to establish between these two diseases. But, as Morgagni has said, *neque enim numerandæ sunt, sed perpendendæ observationes*; we ought not to stop solely upon ascertaining the number of facts, we ought to weigh them and duly appreciate them, that no forced inferences may be drawn, nor any false principles established. In the seventy-seven cases mentioned as the subjects of examination, there were fifty with inflammation of the alimentary canal to greater or less extent. But it should be recollected that diseases of the organs of digestion are much more frequent in young infants than any other disease; that in the Hospice des Enfants Trouvés, most of the children die of those inflammations, and that the induration or œdema of the cellular tissue may exist without the concomitance of an inflammation of the digestive passages. It should also be remembered that the induration of the cellular tissue is of more frequent occurrence in winter than in summer, at which season the phlegmasiæ of the alimentary canal are more rare; but they occur more commonly in summer, when the induration of the cellular tissue is less frequent. These considerations are sufficient to prevent us from attaching to the co-existence of these two kinds of affections, all the importance accorded to them by M. Denis.

In the last place, what is of more importance to note, is, that almost all the indurated or œdematous children exhibit a universal sanguineous congestion, that is very remarkable. Venous blood especially, predominates in their tissues; the heart is almost always gorged with blood, and the large vessels filled, and when the bodies of those who have died of this disease are ex-

amined, it flows from all parts on the incision of the scalpel. This general congestion is more owing to a superabundance of blood in the system, to a kind of congenital plethora, rather than to any mechanical obstruction in the blood vessels. Again: the skin is remarkable for its extraordinary dryness; no moisture appears to transpire on its surface; it is arid and tense, bearing the evidences of great disturbance in the capillary circulation, and that the cellular tissue, which physiologists tell us is the seat of the very abundant secretion of perspirable matter, is clogged in the exercise of its proper functions. In the first place, the materials for its secretion have come to it in great abundance, since the whole of the tissues are engorged with blood; and in the second place, the state of dryness of the skin, the suspension of cutaneous transpiration, and perhaps that also of the pulmonary transpiration, prevent the free flow of the secretion, which, remaining in the same cells which produced it, causes the œdema that has received the name of induration of the cellular tissue. There is one circumstance which goes to support the opinion we have advanced, relative to the effect of the suspension of cutaneous transpiration on the passive infiltration of the cellular tissue; it is, that irritating frictions of the skin, such as camphorated oil of chamomile, will cause rapid disappearance of the œdema; and when the child is wrapped in warm woollen applied to the skin, it is surprising to find it on the succeeding day bathed in sweat, which sometimes rises in a thick vapor, and to see the disappearance, at the same time, of the induration to a greater or less extent. To conclude: it cannot be admitted, I think, as is asserted by M. Denis, that the disease now under consideration is a phlegmasiæ of the cellular tissue, for inflammation of this tissue gives rise to a very quick and abundant secretion of pus, possessing peculiar properties; and nothing of this kind appears in the limbs of œdematous children, which are not usually the seat of phlegmonous tumors.

General conclusion.—In following the analytic method in the study of the phenomena of life, in accordance with the advice of the celebrated Pinel, we believe that the following truths have been established.

1st. The induration of the cellular tissue in young infants, is nothing else than simple œdema, analogous to the œdema of

adults. It may be either local or general: it should always be distinguished from induration of the adipose tissue.

2dly. This disease is more common in winter than in summer, and more frequent in young infants than in those of more advanced age. The predisposing causes are—1st, The natural feebleness of the child; 2dly, A state of general and congenital plethora; 3dly, A superabundance of venous blood in the tissues; 4thly, A dry state of the skin before the exfoliation of the epidermis. The immediate causes are—1st, An obstruction in the course of the blood, resulting from its quantity in the circulatory apparatus; 2dly, Its engorgement in the cellular tissue, to which it furnishes too much materials for secretion; 3dly, and lastly, The action of external agents on the skin, which, without condensing the serous fluid, as has been asserted, are yet capable of suspending the cutaneous transpiration, and thus favor the accumulation of serosity in the cellular tissue. The sanguineous engorgement of the liver, lungs, and heart, the persistence or closure of the fœtal openings, are not the exclusive and indispensable causes of this affection; they ought not to be considered as concomitant phenomena, and as accessory circumstances to a disease which may exist without them, and which is often observed to be the case in local œdema or induration.

3dly. When œdema is general, and the serous congestion is carried to a high degree, all parts where there exists cellular tissue undergo a disturbance in the functions which they discharge. Thus, the glottis becoming œdematous at the same time that the lungs are the seat of congestion, the cry of the child is generally painful, acute, and smothered. The slowness of the circulation easily explains the coldness of the limbs, and the state of debility into which the patient falls. In this manner all the symptoms described by authors may be explained.

4thly. The therapeutic indications pointed out by these considerations are—1st, To relieve, by suitable evacuations, the general plethora; 2dly, To excite the skin by irritating frictions, by the use of woollen garments next to the skin, and the adoption of all means proper to establish cutaneous transpiration. Vapor baths, for the administration of which M. Péligré has constructed a very ingenious apparatus at the Hospice des Enfants Trouvés, has not, according to the experience of M. Baron, so good an ef-

fect as frictions, and the application of woollen to the skin. I have often seen the latter succeed perfectly. The respiration of a child during its continuance in the bath is painfully accelerated, and congestion and effusion on the lungs or brain have been seen to follow the use of these baths.

Such are the conclusions which naturally flow from the consideration of the facts contained in this chapter. I have not, as will be seen, attempted to overthrow altogether any particular theory of those authors who have written on this subject; but have approved or controverted each, as they appeared to me to be either correct or otherwise. It is not by destroying exclusive theories and replacing them with others not less exclusive, that the edifice of science is to be perfected, but rather by establishing the facts by analysis, and gathering the results of the observations of all men and all times.

I shall finish my remarks on this subject by mentioning a fact worthy of notice. The great mortality of the Hospice des Enfants Trouvés has, for a long time, been attributed to induration of the cellular tissue. This, I believe, is incorrect. There often exist at the same time affections of the brain, lungs, and intestinal canal, much more serious than œdema, and much more fatal to children. The number of those who really died of œdema or induration of the cellular tissue, that is to say, in that state of plethora and general congestion which I have described, without the existence of serious lesions of some of the organs at the same time, amounted in 1826 to fifty. The following is an extract from the register of deaths in the hospital:

January,	8	July,	0
February,	2	August,	2
March,	4	September,	2
April,	8	October,	3
May,	13	November,	0
June,	4	December,	4

It was in the months of May and November that the greatest number affected with induration, were admitted. All these patients, in the latter month particularly, died of affections of some important organ, and more frequently of that of the lungs, rather than of induration of the cellular substance.

When œdema is local, or if it be general and yet not severe, it

is not to be regarded as a fatal disease; nor will it become so unless complicated with some affection seated on an organ essential to life.

CHAPTER II.

DISEASES OF THE DIGESTIVE APPARATUS.

I HAVE adopted the division of the alimentary canal proposed by Meckel, who considers it as consisting of the cephalic, thoracic, and abdominal or subdiaphragmatic portions.

The cephalic portion comprehends the mouth and its appendages. I shall, in the first place, consider the form and aspect which they present in a state of health, both during intra-uterine life, as well as after birth.

The buccal cavity is very small at the first period of foetal existence; it is not until about two months that it deserves the name of a cavity, and it is then almost entirely filled with the tongue; and the motions of the lower jaw are so limited, that I doubt whether, at this period, there could be any motions exercised analogous to those of deglutition. The color of the membrane lining the mouth, and that of the tongue, does not present any thing remarkable until about the sixth month; but at this time, and to the seventh, eighth, and ninth month, it deserves some notice. It may be more or less colored, and more or less injected, agreeing with the general condition of the foetus; for in three individuals of this age whom I dissected, it was in one of a violet red, and in the other two pale red. From the seventh to the ninth month, the color of the buccal membrane is generally of a deep rose; the papillæ at the extremity of the tongue are more projecting, but those at its base better delineated and more prominent; the pillars of the velum, and the velum palati itself, present the arrangements of the parts which they afterwards have, and the distance with which they are separated from the external opening of the mouth, is evidently increased. And again: the lateral parietes of this cavity are separated, and the lower

jaw has become more moveable, so that at the sixth to the eighth month, the buccal cavity becoming larger, and the lower jaw admitting of more motion, it is possible that the child may execute some movement analogous to mastication or deglutition; this is indeed what really occurs, if we may judge from analogy and from the observations made on quadrupeds by Haller, and subsequently by Béclard.

At the period of birth, the buccal membrane is usually very red; it is the same with the tongue and gums; all these parts are congested with blood analogous to that of the external integuments; they might be pronounced inflamed on a superficial inspection, but against such an error we should be carefully guarded. They gradually lose this deep color, and soon acquire that of the rose, which is, for the most part, the color of the skin; for in children whose integuments are very pale, the buccal membrane, if it be not inflamed, is itself but faintly colored.

The salivary glands are scarcely visible during two-thirds of the foetal life; it is only towards the seventh month of gestation that they acquire any size. At first they consist of a few granulations which are blended with the cellular tissue; but at seven to nine months they agglomerate, and assume their proper form. Their excretory ducts open into the buccal cavity by a hole almost imperceptible. The sublingual gland appears to me to be developed the first, then the submaxillary, and lastly the parotid.

At birth these glands are scarcely formed; but they are developed with great activity, and towards the seventh month, that is, when the incisor teeth appear, the sublingual and parotid glands are considerably augmented in size and furnish an abundant secretion. It appears as if their development and functional activity are more perfect in proportion as the mouth, and especially the gums, require to be moistened and softened.

SECTION I.

DISEASES OF THE MOUTH.

§ I. CONGENITAL MALFORMATIONS.—*Absence of the mouth.*—The malformations of the mouth and those of the face in general have been described with great care by M. Laroche of

Angers, in his excellent inaugural dissertation.* This author correctly distinguishes between the complete absence of the mouth and the obliteration of its anterior orifice.

The absence of the buccal cavity is called astomia (*αστομία*), and the obliteration of the anterior orifice, atresia of the mouth.

The absence of the buccal cavity occurs when the bones of the face have been arrested in their development, and particularly when the lower jaw is wanting. This deformity cannot be remedied, and the child affected with it soon dies. Sometimes, M. Laroche observes, in the place of a mouth an irregular opening is found, although situated lower, and communicating with the larynx and œsophagus. Borichius has seen instead of the mouth, a hole in the right cheek.

In a very young embryo, five or six weeks old, for instance, the mouth is not closed, properly speaking; but the two lips are so closely approximated, and the labial orifice so narrow, that one can hardly be led to believe that an orifice exists. Yet the contrary may be easily ascertained by separating the lips with the point of a needle. The buccal cavity may then be easily distinguished, entirely filled with the tongue, which extends to the borders of the lips. In the natural state, this opening gradually enlarges, the borders of the lips cease to be contiguous; at about four months, the commissures are found to be on each side, on a line drawn perpendicularly from the middle of the eyebrows. Finally, at six, seven, and nine months, this opening acquires a diameter corresponding in size to the other parts of the head.

Obliteration of the mouth.—It sometimes happens that the borders of the lips, irritated and inflamed at some period of the intra-uterine life, contract and adhere either in a part or in the whole of their extent, and we can conceive, from this, the possibility of an incomplete or complete obliteration of the mouth. There exist but few instances of this malformation; when it is met with, it may be remedied by making, with a suitable incision, an artificial buccal opening, or by separating the adhesions which make it incomplete.

Congenital division of the lips, or hare-lip.—The upper, and

* *Essai d'anat. path. sur les monstruosités ou vices de conformation de la face*; thèse présentée et soutenue à la Faculté de Médecine de Paris, le 3 juillet, 1823.

very rarely the under lip, sometimes exhibits solutions of continuity or vertical divisions, either at the middle, or at the lateral part of the raphe, on one or on both sides. This congenital division exists the more often with hydrocephalia, anencephalia, or acephalia. It may consist of the commencement of the division, of a complete division, or of the absence of a considerable portion of the upper lip and alveolar arch, whence results a deformity of the buccal opening, known vulgarly by the name of *wolf-mouth*.

Anatomists have explained, in different ways, the cause of this malformation.

One of the most probable is that given by J. F. Meckel. He considers hare-lip as the result of an arrest of the development. According to him, the formation of the upper lip commences at three points, one middle and two lateral. If these three points do not unite, but leave between them the intervals which separated them in the primitive state of embryotic life, the child then has a double hare-lip, that is to say, two vertical clefts of the upper lip. Each of these clefts is directed obliquely outward, and a red fleshy tubercle exists between them, the appearance and form of which are very variable. If but one of these parts unites whilst the other remains isolated, only one fissure or cleft exists either on the right or left of the median line. When the fissure is double, the alæ of the nose are drawn outward to a greater or less extent. Lastly, it very often happens, that behind these solutions of continuity of the upper lip, the alveolar process is also divided either on one side only, or on both sides at once, and the fissure is generally found between the second incisor and the canine tooth, although it is possible to meet with it between the first and second incisors.

Division of the palatine arch and velum.—The two lateral parts of the palatine arch, in place of uniting on the median line, as is observed in the normal state, may be arrested in their development, and leave between them a fissure varying in depth and breadth, which establishes a communication between the mouth and the nasal passages. And the velum itself may likewise have the same imperfection of development, and exhibit at its central part a complete or incomplete cleft, which interferes with deglutition, alters the tone of the cry, and at a later period prevents, to a considerable degree, or greatly impedes articula-

tion. These divisions of the constituent parts of the mouth, may exist separately or together in the same individual. The extreme deformity, in times of gross ignorance, induced the belief that it was possible for a child to be born with the face of a hare, a calf, or wolf—most absurd comparisons, which are not deserving mention at this day, except to cite them as examples of the whimsical fancy of the human mind.

The curative means so happily conceived by surgeons, and which have been employed with so much success, ought not to be adopted in early infancy. It will be necessary to wait until the child is more advanced in age, before the operation for hare-lip, or that of staphyloraphy, is performed. It remains for us to point out here the particular care which an infant affected with this organic deviation requires.

The division of the upper lip prevents sucking, and especially when it is double; and such is the difficulty in some children, that it is necessary to bring them up with the spoon. The deglutition of liquids in those children affected with a division of the palatine arch and velum, is so difficult and dangerous, that the child is sometimes threatened with suffocation when the liquids taken pass into wrong passages. I cannot refrain from introducing here the excellent advice of professor Roux on this subject.

“A child born with a bifid velum, and at the same time with the arch of the palate and the lips perfectly formed, can, without difficulty, take the breast of its mother or nurse; but as it cannot empty the mouth, it sucks badly, or perhaps cannot suck at all, particularly if kept in a horizontal posture; deglutition also is performed in a defective manner.” M. Roux advises the placing of the child in a vertical position when it is about to suck, and to assist the mechanism of suction by gently pressing the breast. If there exist a large communication between the mouth and the nasal fossæ, it will be better to cause the child to drink its milk from a small spoon. A child was one day brought to M. Roux affected with a division of the velum and arch of the palate, that for eight days had not been able to suck. This child was reduced to a state of marasmus, and appeared about to perish. M. Roux caused the child to be held erect, and in this position gave it a small spoonful of sugared water. In this manner it drank a

glassful. From this time, it was artificially fed by taking the same precautions, and was soon relieved from the state of languor and wasting in which it had fallen.*

The different parts which constitute the buccal cavity, may likewise present some malformation. M. Laroche† has pointed out as such—1st, The congenital fissure of the cheeks, of which Nicati has published two cases; in one, the fissure was double, and extended from the angle of the lips, terminating at the globe of the eye; in the other, it only existed on the right side. This last fœtus presented besides, a division of the left lip, and a double insertion of the umbilical cord, one at the umbilicus and the other at the head.‡ These fissures probably depended on the slow union of the different pieces which compose the bone of the upper jaw.

2dly, The uvula may be partially or entirely wanting, (Wedel, *Eph. nat. cur. dec. 2, obs. 2.*)

3dly, The tongue may be very small, but it is never absent except in the case of absence of the face. It may be defective in symmetry, and not exhibit the sulcus in the centre, of which I have seen a very striking example. This organ has been seen deprived of all the muscles of one side; (Cholet, *dans la Dessertation de Laroche*,) offering a bifid point; (*Dana Mém. de Turin*, 1787.) The tongue may be very small and hollowed like a canal, (Haller, *Opera minora*, p. 9.) As to adhesions of the tongue, they have been explained by saying that the same state is met with in the normal condition of the embryo. I have dissected with great care three embryos, of six weeks, of two months, and of nine weeks, and did not find in either, the tongue adhering to the subjacent part. It was very much developed, and had no other adhesions except at the base and frœnum. The lateral and inferior parts were free.

The frœnum of the tongue may be too long, and thus may embarrass the movements of this organ and the mechanism of sucking. The frœnum should be cut immediately after birth; this may be done by raising the tongue with a grooved director

* *Mémoire sur la staphyloraphie, ou Suture du voile du palais.* Paris, 1825.

† *Loc. cit.*

‡ were there not rather two umbilical cords, and was not this a trace of the inclusion of another fœtus?

held in the left hand, whilst with a scissors in the right hand, the preternatural membrane which forms the adhesion, is cut to the required extent. If the cutting of the vessels causes a hemorrhage, which is increased by the suction of the child, it will be necessary to cauterize the veins and arteries with nitrate of silver, or with a red hot needle.*

The Vandermonde journal of medicine and pharmacy contains an example of a child born with a monstrous tongue. After the birth of this child, this organ appeared much longer and thicker than usual, and entirely prevented sucking. The surgeon in attendance having examined it, found that it adhered to the gums and lower jaw by a spongy tumor of the size of a small filbert. He tried by all the means in his power to separate the tumor from the tongue, but the hemorrhage, which was considerable, intimidated him. The part which he had begun to separate afterwards united, the tumor increased in size from day to day, and affected the tongue, with which it appeared to unite itself; and after a short time no difference could be perceived between the tumor and the tongue. "During this interval the child lived only on liquid aliments, which were introduced far into the mouth to enable it to swallow, which it accomplished by drawing the lower jaw farther back than the upper. In this manner it took the breast; and it was quite a pleasure to observe with what quickness and dexterity this young infant, instructed by its wants, advanced and drew back the lower jaw in drawing at the breast." In proportion as the child increased in age the tongue increased in size; at last it was two inches thick, and projected four fingers breadth from the mouth. The incisors and canine teeth fell out; the lower jaw was bent in the middle, and presented a hollow in which the tongue was lodged. The child could chew and articulate sounds in spite of this infirmity.†

* The work of J. L. Petit, entitled *Observations anatomiques et pathologiques*, on the frænum of the tongue, may be advantageously consulted. In a chapter in his *Traité des mal. chir.*, will be found some important observations which deserve the attention of the practitioner. The simple incision of the frænum is not an operation to be done lightly; and although at this day it is not considered so dangerous as it was formerly, yet care should be taken to prevent and to remedy accidents which may attend it.

† Observations published by M. Mauraut, surgeon in Mortigue in Provence, *Journ. de méd., chir. et pharm.* t. 15, p. 158.

This child ought to have been relieved by perforating the tongue and passing a double ligature, which, being tightened gradually on each side, would have detached, by degrees, the superfluous appendage without hemorrhage. It is known that Mirault of Angers has performed this operation with success on an adult.

4thly, The lower jaw may be wanting, or be of a remarkably small size. I have seen a child born with all the constituent parts of the mouth reduced to extremely small dimensions. I shall here record this curious case in detail.

CASE IX.—On the 25th of June, 1826, a young female infant was brought to the Hospice des Enfants Trouvés. The inferior portion of the face was very much narrowed; and the two cheeks, instead of being round and projecting, were almost concave; the opening of the mouth was very narrow, the lips round and prominent, the lower jaw projecting and extremely narrow; the tongue straight and pointed, having altogether the form of a hare's tongue; the isthmus of the fauces was very narrow. The child could not take the breast, and drank with great difficulty; the imperfect deglutition caused sometimes a dangerous suffocation. The cry was acute and jerking, and both the parts constituting it were distinctly heard. This child soon perished from enteritis, on which account it was placed in the infirmary. On the examination of the dead body, the various parts just enumerated were measured, and were of the following dimensions: the anterior orifice of the mouth was six lines in diameter; the tongue, from the base to the point, two inches and two lines, and its diameter near the base, six lines, and at the point, five; the distance between the two large cornua of the os hyoides, was seven lines; and the distance between angles of the lower jaw was found to be fifteen lines; the greatest diameter of the palatine arch was fourteen lines; the ossification of the lower jaw was as much advanced as it usually is at birth, and the tongue possessed all its muscles.

Thus, all these parts were of their natural length, but not of their ordinary breadth, so that it may be said that the lateral portions of the face had been compressed in a manner to hinder their development in breadth. I acknowledge that I could not find

the cause of the deformity in this child, who, in other respects, possessed a perfect organization.

§ II. PASSIVE CONGESTION.—Passive congestions of the buccal membrane are rare during intra-uterine life; yet I once saw in an infant just born an ecchymosis at the base of the tongue; it was of a violet color, and spread from the base to the middle part of the organ; it penetrated to the depth of three lines. The tissue of the tongue was very much softened at this place. There was nothing else in the general condition of this subject worthy of remark.

It is very common to meet, at birth, with instances in which the buccal membrane is the seat of a well-marked congestion. This congestion, and the redness arising from it, disappear by degrees after birth; but certain portions may remain, for some weeks, the seat of red patches, which however are gradually effaced. An ecchymosis of greater or less extent, is often seen continuing for a long time in the palatine arch.

§ III. INFLAMMATIONS.—Inflammations of the buccal membrane are distinguished by the term stomatitis.

STOMATITIS.

It is impossible to convey, by a general description, a proper knowledge of stomatitis, because every part which enters into the composition of the parietes of the mouth, may become the special seat of the varieties of inflammation which are developed in this cavity. The disease then takes a peculiar aspect, and gives rise to symptoms which are proper to it; so true it is, that the different modes of alteration of organs are often the principal and essential cause of the difference of the symptoms of diseases.

I shall therefore describe stomatitis under the following varieties:

Erythematic,
With altered secretion, (muguet,)
Follicular, (aphthæ,)
Ulcerous,
Gangrenous.

ERYTHEMATIC STOMATITIS.

The congested state in which the buccal membrane always exists in new-born children, disposes it to become the seat of erythematic stomatitis, an affection usually characterized by redness, heat, and sometimes by dryness of the parietes of the mouth and of the tongue. This is usually the first degree or precursory symptom of the other varieties of stomatitis. It varies in intensity, and is either transitory in its duration, or may continue for a length of time. It often accompanies inflammation of the stomach or intestinal canal; but it rarely gives rise to any febrile derangement in very young infants; but in children from seven to nine months of age, it is often accompanied by this symptom. The inflammation is confined, in some cases, to one part of the mouth, while in others it occupies the entire cavity, and spreading to the lips, they tumefy, excoriate, crack, and frequently become the seat of herpes *labialis*.

When this inflammation is of long duration, it may produce an abundant ptyalism, particularly in children from seven to nine months.

Simple erythematic stomatitis promptly yields to emollient gargles and to milk diet; and when it is accompanied by a phlegmasia of the stomach or intestines, it disappears in proportion to the dissipation of the gastric inflammation accompanying it.

STOMATITIS WITH ALTERED SECRETION, OR MUGUET.

Many pathologists have confounded muguet with aphthæ. In order to avoid the confusion into which they have fallen, we will, in the first place, establish the characteristic differences of these two diseases. It was not until the labors of MM. Breschet and Guersent appeared, that sufficient data were established in relation to this variety of inflammation. M. Veron, in an essay read at the Académie royale de Médecine, and M. Lélut, in a paper placed in Archives general de médecine, (March, 1827,) have contributed much to elucidate the history of the disease in question. We will endeavor to present its history divested of all discussion, and the vain show of scholastic erudition.

It is characterized by a concretion of mucus on the surface of

inflamed mucous membranes, whether the membrane be an epithelium or not.

This concretion may be observed in the mouth, œsophagus, stomach, and small or large intestines. This last assertion may appear strange after what some physicians, and particularly M. Veron, have said on this subject; but I advance it here, as it will presently be supported by unexceptionable proofs. I will confine myself to muguet of the mouth.

This affection appears under three different forms—1st, under the form of very small white points, dispersed upon the tongue and parietes of the mouth; 2dly, that of variously sized shreds; 3dly, that of a membrane entirely covering the tongue, or spread over the other parts of the buccal cavity. I do not speak of the yellow or red color which the pellicle sometimes assumes, because it depends on the contact of bile, or on a sanguineous exhalation on the surface of the mucous membrane, circumstances altogether independent of the disease now under consideration.

This excretion, under what form soever it may appear, is usually preceded by an erythematic inflammation of the surface of the tongue, or of the parietes of the mouth. When inflammation has continued one, two, or three days, there are seen at the extremity, or on the sides of the tongue, or on the internal surface of the lip, small white points which appear to crown the papillæ of the membrane to which they adhere. I have examined the seat of this excretion with great care, and I never saw it under the epithelium, on the surface of which it is always seated. It overspreads the membrane like mucus, of which indeed the muguet is but a morbid concretion.

This is the first degree of the disease, which, as I have just remarked, is always preceded by inflammation of the mouth. If the inflammation makes no progress, and if the excretion accompanying it is suspended, the white points alluded to soon disappear, and the disease may be regarded as mild.

When the inflammation has made some progress, the white points unite and form small laminæ either on the surface of the tongue or on the internal surface of the lips and cheeks. These laminæ, becoming very thick, exfoliate and detach themselves, leaving in their places an inflamed surface, which soon secretes materials for a new concretion, until at last, the inflammation

ceasing, the reproduction of morbid matter is no longer to be observed.

The disease increasing, the inflammation spreads rapidly and deeply over the whole cavity of the mouth; the laminæ of which I have spoken, quickly uniting, form a pellicle of a greater or less extent and thickness, which spreads over the tongue, sides of the mouth, and velum. Under these circumstances, as in the preceding, the disease is said to be confluent or malignant. Such is the exhibition of the three principal aspects of this inflammation as it appears in the mouth. These varieties are more remarkable with reference to their ordinary seat. The pointed variety usually occupies the extremity and edges of the tongue; that in laminæ appears on the internal surface of the lips and cheeks; the membraniform occurs at the base of the tongue and on the velum. To a certain extent, the reason of this difference of appearance can be explained. The pointed variety, which is noticed on the upper part of the tongue, occurs in the numerous papillæ, secreting at their extremities small mucous drops which immediately concrete. As the papillæ and villosities of the mucous membrane are longer and less fine at the palate, base of the tongue, and on the internal surface of the cheeks, the mucus is secreted in the form of a covering, and concretes in the same manner, assuming the membraniform appearance spoken of above.

We shall now take several interesting questions into consideration, and endeavor to ascertain the nature, causes, symptoms, complications, and treatment of this species of inflammation.

It is admitted as a fact, sanctioned by the observations of the present time, that the accumulation of blood, redness, and without doubt, pain in the mucous membrane of the mouth, always precede the appearance of the white points. It is also worthy of remark, that the pellicular or curdy production takes the place of the mucus which moistens and lubricates the mouth. Thus, then, this affection follows an accumulation of blood in the inflamed membrane, and replaces the normal secretion of mucus. It is probable that the blood accumulated by the inflammatory stimulus in the thickness of the mucous tissue, transmits to it the materials of secretion, the product of which concretes on the surface of the epithelium, in proportion as it is deposited there.

Does this facility in the mucus to concrete arise from the blood, in children and sometimes in adults who are found in analogous cases, having been rendered more plastic and rich in fibrin by the inflammatory condition, thereby supplying the elements of a mucus abounding in fibrin? This is a question the solution of which we will leave to those who, more fortunate than we, have better authority than conjecture. The researches of M. Lélut go to the support of this opinion; for this physician, having treated the pellicle or false membrane by chymical agents, arrived at results nearly resembling those which have been obtained from the examination of mucus by Fourcroy, Schwilgué, Vauquelin, Berzelius, and Hatchett; or of the epidermis by Bichat, Vauquelin, and Hatchett; or of the buff of the blood, the false membrane of the serous membranes, of the bladder, or croup by Schwilgué, Double, Guersent, Desrouelles,* and Bretonneau.† Such are the few data we possess on the nature of the disease; let us now examine the causes.

This affection shows itself more commonly in early infancy. Sucking infants are more often the subjects of it than those more advanced in age. There exists something peculiar in the constitution of one so young which singularly disposes it to this modification of inflammation; and those children that are crowded together in the same place, are feeble and wretched, and that receive unsuitable nourishment at an age when nutrition plays the principal part in the functions of the economy, are the subjects of stomatitis and muguet of the greatest intensity. There is no part of the year that can be mentioned as peculiarly favorable to the development of this disease. It prevails with almost equal intensity, and at all times, at the Hospice des Enfants Trouvés. In the quarter ending in March, 1826, in two hundred and ninety patients, there were thirty-four cases of it. In the quarter ending in June, in two hundred and thirty-five patients, there were thirty-five; in the quarter ending in September, in two hundred and thirteen sick, there were one hundred and one cases; and forty-eight cases in the quarter ending in December, among one hundred and eighty-nine patients. M. Baron has seen it prevail among a number of individuals at certain periods, without being

* *Traité théorique et pratique du croup.* Paris, 1824.

† *Archives générales de médecine*, March, 1827.

able to assign for its cause any influence from temperature. I am disposed to think that the development of this disease is more connected with the constitution of the patients, and to their disposition to inflammation of the mucous membranes, than to any cause of an atmospheric nature.

I do not believe it is contagious. M. Baron rejects entirely the idea of contagion, from often having seen children drink from the cup used by those who have been affected, without contracting the disease. This fact I also have observed.

From these considerations, it follows that the causes of this disease are : the first period of infancy—bad nutrition—the assemblage of a great number of children in the same place—debility—inflammation of the buccal membrane—and lastly, the disposition which the mucous membranes exhibit in young children to be covered, when they are inflamed, with thick, curdy, and membraniform concretions.

The local symptoms are found traced in the description given of the development and form of the morbid excretion, which shows itself on the surface of the inflamed mouth. As to general symptoms, they scarcely exist in very young infants ; fever is hardly ever manifested. I counted the pulse and the beatings of the heart in forty children, aged from one to twenty days, affected with it, and found fifty, sixty, sixty-five, eighty, and in one instance one hundred, pulsations in a minute. With the exception of the last case, the number of pulsations did not differ from the natural state of the pulse, as will be seen on comparing what has been just stated with what has been already said upon the state of the pulse.

The skin is usually hot and dry, and the thirst great. The cry does not vary except with reference to its strength and feebleness ; yet when the membraniform concretions spread to the glands, and cover the pillars of the velum, the cry then becomes husky.

It is sometimes complicated with other phlegmasiæ. In fifty cases which were fatal either from the progress of the disease, or from some other affections, I found, as complications, a phlegmasia of the cerebro-spinal apparatus in two children ; of the skin in four ; of the respiratory and circulatory apparatus in twelve ; and of the digestive apparatus in thirty-two. Whence it results

that the inflammation of the digestive apparatus is its most usual accompaniment, while the other phlegmasiæ are of accidental occurrence.

In the thirty-two children presenting the complication of phlegmasiæ of the alimentary canal, there were ten where the stomach was not inflamed. In six of these, the large intestines, and in four the small intestines, were found more or less inflamed. As to the remaining twenty-two, they showed an inflammation of the stomach, œsophagus, or of some part of the great or small intestines.

This disease, therefore, is not always a sign of gastritis, since it can exist without this phlegmasia; but it coexists almost always with an inflammatory state of some part of the intestinal canal. This assertion, already made by several authors, needed still the support of well-established facts, and these are what I had proposed to give here.

The treatment of muguet flows naturally from the exposition of the facts which have been exhibited, and from the nature of the considerations to which they give rise.

When it is simple, and consists of nothing more than a few points disseminated over the surface of the tongue, or on the borders of the lips, all that is required is to wash the mouth of the child several times a day with a piece of lint soaked in a decoction of marshmallows. If it should be more confluent, and complicated with a phlegmasia of the digestive organs, or of some other important part, in addition to emollient gargles, the accompanying disease ought to be met by appropriate treatment; which will be found in the history of each of these diseases. I have seen this treatment, simple as it appears, completely successful in the hands of M. Baron. M. Guersent advises, besides, the employment of some mucilaginous decoction to which is added a fourth part of the chloride of soda, as a wash for the mouth of the child. This preparation, diluted with mucilage, observes M. Guersent, appears to me preferable to a solution of subborate of soda, or that of the sulphate of zinc. It is equally preferable, in injections, to lime water, which is irritating to the intestines.* A small quantity of alum may be added to

* Guersent, art. *Muguet*, du Dict. de Méd. in 21 vols.

the gargles, after having ineffectually employed emollient lotions.

The remarks which have been made on confluent muguet, are equally applicable to certain phlegmasiæ of the mouth and gums, which produce a concretion more or less abundant, covering with white or yellow pellicles the gums and internal surface of the cheeks. Several authors have described this phlegmasia under the name of aphthæ; others have called it pustular, pellicular inflammation, etc. These varieties may be referred to stomatitis with altered secretions, and should be treated with the same therapeutic means.

FOLLICULAR STOMATITIS, OR APHTHÆ.

For a long time pathologists were not agreed as to the true nature and seat of aphthæ; in order to be satisfied of this, it is only necessary to cast a glance over the principal works which have been published on this subject.

Hippocrates and Aretæus, it is said, described this disease, but it is difficult to find the essential characters of it mentioned in their writings. Hippocrates mentions it without any description. "*In ætatibus autem talia eveniunt. Parvis quidem, et recens natis pueris aphthæ vomitus, tusses, vigilæ, pavores, umbilici inflammationes, aurium humiditates.*"* Aretæus scarcely enables us to undersand, in the following passage, whether he is speaking of aphthæ. "*Crustam vero circumveniunt rubor excellens et inflammatio et venarum dolor, quemadmodum in carbunculo; exiguæ raræque pustulæ quas Græci exanthemata vocant, orientes, hisque aliæ supervenientes in usum coalescunt; atquæ indè latum ulcus efficitur.*"† If Aretæus wished to designate by the expression *exiguæ raræque pustulæ*, the inflamed follicles of the mouth, it must be allowed that he has lost the proper distinction of it in the confused description of the various affections of the mouth, each of which merits a place in a perfect and complete nosological arrangement.

The commentators of Hippocrates, Galen, Celsus, and Aretæus have exhausted themselves in vain conjectures to ascertain to

* Aphorism 24, Sec. 3.

† *De tonsillarum ulceribus*, cap. 9.

what alterations of tissue aphthæ are to be referred. Some physicians, such as Boerhaave, Van Swieten, Stohl, Armstrong, and Underwood, have applied this term to ulcers of the mouth, whatever may have been their primitive form. Others, as Sylvius, Mercurialis, Etmuller, and Pinel, have regarded them as vesicular pustules, white in the centre, red at their borders, having a great analogy to the mucous disease of Ræderer and Wagler; an opinion to which Gardien appears to incline. Which of these various opinions shall be adopted?

Bichat, whose genius has discovered all the advantages that may be drawn from the study of the anatomical characters of diseases, in order to establish positively their differences and analogies, says, on finishing his chapter on the mucous chorion: "Are aphthæ an affection of the mucous chorion? do they appertain to the papillæ? are they seated in the glands? do they arise from the isolated inflammation of these glands, while catarrh is characterized by a general inflammation of the mucous system spread to a great extent? All these questions deserve to be examined, and Pinel has felt the defects of pathological anatomy on this point."*

Gardien has not been willing to attempt the solution of a question, upon which, says he, Bichat has not ventured to pronounce an opinion. He has been contented to describe in detail, and with great care, the history of the opinions advanced upon the nature and progress of aphthæ from the remotest antiquity to the present day.† But whatever distrust one may have, as regards his own abilities, ought he always on that account to stop at difficulties which have foiled men of greater talents? and from the constant progress which is made in pathological anatomy, furnishing incessantly new materials, are we not at this day better able to solve the problems which in the time of Bichat were considered as not admitting of solution? I am of this opinion; and though I might perhaps do better by imitating a modesty so honorable to him, it would be prejudicial to the cause of science, since it confines our efforts and arrests our discoveries. I will therefore attempt to respond to the questions of Bichat, and

* *Anat. Gén.* Tome 4, p. 437.

† Gardien, *Traité complet d'accouchemens et des Maladies des femmes et des enfans.* Tom. 4, p. 115.

show that aphthæ consist of an inflammation of the muciparous follicles of the mouth.

The muciparous follicles of the mucous membrane of the mouth are invisible in their ordinary state, and remain hidden in the thickness of the membrane, and compensate by their infinite number for the smallness of their size; but when they begin to inflame and to tumefy, they appear on the internal surface of the lips and cheeks, on the pillars of the velum and the palatine arch, on the inferior surface and the lateral parts of the base of the tongue, under the form of small white points, sometimes exhibiting a colored spot in their centre, slightly prominent, and often surrounded by a slight inflammatory circle. These follicles are either isolated and few in number, or multiplied and spread over every part of the mouth. Sometimes they may be felt with the finger, when they are not sufficiently distinct to be seen. They often do not stop at the mouth, but spread to the œsophagus, stomach, and intestinal tube. I shall confine myself here to the consideration of the follicles of the mouth.

The inflammation of these follicles is sometimes arrested in the first stage, and will remain for a greater or less time without producing any symptom, but this inflammation will often make a considerable progress, and insensibly produces the following alterations:

The follicular points enlarge, preserving also their circular, primitive form; and from their central aperture there soon issues a white matter, which being squeezed by the epithelium, the ulceration of which soon commences, leaves the white puriform matter of which I have just spoken, freely exuded over the parts.

The aphthæ take a new aspect, and then commences the second stage, or period of ulceration. The projecting points of which mention has been made, are neither tubercles, as M. Gardien has said, nor vesicles nor pustules as has been asserted by others; but they are evidently the muciparous follicles, as their central orifice and unvarying form demonstrate. They are analogous, in every respect, to those which are found in the stomach, small intestines, cæcum, and colon. Now, if this be the case, why then does there exist a doubt, that the ulceration which follows at these follicular points, is the result of their inflammation? wherefore is there still an opposition to the idea that aphthæ

are inflamed follicles of the buccal cavity, when there is no doubt, at the present day, that the round ulcers throughout the small intestines are the effects of an inflammation of the glands in those regions, and which possess the greatest analogy to those of the mouth? But the better to elucidate a question upon which Bichat has hesitated to give an opinion, let us pursue our description.

The follicle once broken, consists only of a prominent mark; it is a superficial ulcer, with circular borders, sometimes slightly cupped, more or less tumefied, and almost always surrounded by a red inflammatory circle. That the borders and the centre of this light ulceration often secrete a white, pultaceous matter, adhering like a small scab, ending by becoming detached and ejected with the saliva of the child.

Isolated aphthæ generally occupy the internal surface of the lower lip, the frænum of the tongue, the internal surface of the cheeks, and when there are no teeth, the summit of the gums.

If the aphthæ are in great numbers and very near each other, their borders unite, the curdy matter, which they excrete, spreads from one to the other, forming a bed of greater or less extent and thickness. It is then that aphthæ are confounded with muguet, but they may always be distinguished, in considering the development of the inflamed follicles, and the solution of continuity which does not exist in the latter disease; besides, the excretion which accompanies aphthæ always follows the ulceration, and almost always exists at the internal part of the lips and cheeks, while the white points of the other affection appear at first on the lateral parts, and towards the extremity of the inflamed tongue, extending afterwards to the surrounding parts.

Aphthæ do not always present the same characters in the various places of their development; sometimes when the follicular points are about to ulcerate, the edges of the ulcers, instead of being covered with a slight curdy excretion, exhale a small quantity of blood, which concretes under the form of a slight brown scab, mistaken by some authors, as in malignant sore throat, for a gangrenous eschar. But Guersent and Bretonneau have clearly demonstrated that what has been taken for gangrenous affections of the throat is really nothing but an inflammation of the mucous tissue without loss of substance, an inflammation

giving rise to the formation of a pellicle which, projected by the exhaled blood on the inflamed surface, gives to a certain extent the aspect of an eschar. Before pronouncing, therefore, these eschars to be gangrenous, the nature and causes of the brown scabs covering the aphthous ulcerations should be examined with the closest attention. This mistake might produce fatal consequences, for it is probable that the idea may be conceived of treating with stimulants and tonics a disease which it would be more rational to treat with simple antiphlogistic means.

Yet I do not deny that the ulcerated follicles of the mouth may sometimes terminate in gangrene. I would only remark, that this termination is much less rare than Van Swieten, Rosen, Underwood, and many others appeared to have believed. When the inflammation lessens, or when it yields to the means employed for its relief, the ulcer, on cicatrizing, scarcely ever leaves a sensible trace; its apparent depth arises also from the thickness of its inflamed and tumefied borders.

Thus, then, aphthæ of the mouth may present two stages in their inflammatory development; or they may either consist of small white miliary tumors, or these tumors may ulcerate and become disorganized. Now it results from this, besides being dictated and supported by observation, that aphthæ are neither tumors, as some will say, nor ulcers, as is thought by others; but sometimes one and sometimes the other of these pathological alterations, according as the degree of inflammation is more or less advanced. If occasionally the ulcer alone is observed, it is because the primitive development of the follicle had escaped the attention of the physician, or of those having charge of the patient.

Callisen has well described aphthæ, and has considered them in a manner analogous to that we have adopted. The description which Plenck has given of them, approaches still more to ours, except that he regards as vesicles, accidentally formed, the small tumors which we consider as a morbid development of muciparous follicles. "*Incipiunt aphthæ sub formâ vesicularum miliarum albarum quæ in apice foraminulum gerunt, dein collabuntur et aliquantum latescunt.*"*

* *Doctrina de morbis cutaneis.*

The analogy which some have thought exists between the small tumors of the mouth and those which are observed on the skin in some cutaneous phlegmasiæ, has caused a comparison to be made between aphthæ and miliary eruption.* But this comparison has no foundation, if it be true that aphthæ are owing to a tumefaction of the muciparous follicles. There cannot really be any comparison between them and the vesicles of miliary eruption, from which they essentially differ.

Finally, the aphthous ulcerations differ still from the other ulcerations of the mouth, and which will be hereafter noticed.

Since we are now in possession of some of the data upon the nature and development of aphthæ, let us see what are the causes, general symptoms, complications, and treatment of this disease.

This is not a disease peculiar to infants, for adults are also liable to them. From this, doubtless, arises the division of Bateman, *Aphtha lactantium*, *Aphtha adultorum*. They are particularly to be seen in children who are very feeble, pale, and of a lymphatic temperament. We do not look for the causes of aphthæ in the retention of the meconium, acidity of the milk, or in the predominance of acidity in the fluids of the child; we attach more importance to the consideration of the original predominance of the lymphatic system, or rather to the remarkable predominance which this system acquires under the influence of bad nutrition and vitiated air, which is respired in badly ventilated places, in those who are crowded together with a number of sick children. This is, in truth, the result of the researches and reflections of Raulin, Lapoyrenie, Baudelocque, Auvity, M. Sanponts, and many others. It will appear, then, that the follicular apparatus of the intestinal tube acquires an increased vital energy with the lymphatic system; hence this disposition of infants to inflammation of the follicles, and to the alterations which follow in the different parts of the digestive tube.

I have observed in the Hospice des Enfants Trouvés, that while muguet prevails almost universally among children recently born, aphthæ, on the contrary, are more frequently observed in such as are teething. M. Denis, who denominates these aphthæ ulcerated phlyctenæ, has also remarked that aphthæ are

* Van Swieten, Boerhaave, Sauvage, Arneman, Willan, Bateman, etc.

not developed as often in very young infants.* Now if we follow the anatomical development of the lymphatic glands and follicular apparatus of the digestive tube of a young infant, it will be seen that these glands, scarcely formed at first, grow rapidly in the first four or five months; so that the development of the lymphatic system, drawing with it, as we may say, all the appended parts, impresses on the constitution of the child a peculiar idiosyncrasy, from which results a predisposition to phlegmasiæ of the follicles and muciparous glands. Thus, anatomical and pathological observations are here found to agree, and throughout the whole of this work they will be found to afford a mutual support to the opinions which I shall endeavor to establish.

I will recapitulate the first observations by remarking, that the principal cause of aphthæ lies in the anatomical development and increased vital energy of the follicular apparatus, while other causes of an external nature excite and promote the development.

The general symptoms are often of little moment. For the most part, the child has no febrile action. The skin is hot and dry, but the pulse beats with the greatest tranquillity. In twelve children affected with aphthæ, I found but sixty or eighty pulsations, which certainly indicates the absence of any febrile action. This remark has been for a long time made by those physicians who have attended to infantile diseases. Underwood says, "The thrush, in its commencement, is said to be generally attended with fever; but those who have been of this opinion do not seem to have made what is a very necessary distinction; since I have by no means found this to be the case when the thrush is an original disease, though the mouth is so much heated as to excoriate the nipples of the nurse, and become so tender that the child is often observed to suck with reluctance and caution."†

Fever does not show itself in children affected with aphthæ, until they are a little advanced in age, and even then all may not experience it. This remark, which I make by the way, is worthy of the attention of physicians, for its application will be found in the history of general pathology. Indeed, was it not from the

* *Recherches d'anatomic et de physiologie pathologiques sur plusieurs maladies des enfans nouveau-nés*, Commerce, 1826.

† *Treatise on the Diseases of Children*, by Underwood, p. 35.

peculiar alteration of the mucous membrane of the alimentary canal, that the celebrated Pinel gave the name of mucous fever to one of his essential fevers? But if this alteration can exist without fever, as is the case in very young children, the seat and cause of the fever must be in some other part than in the alteration of which the fever is but a possible and not a necessary nor constant symptom. Yet M. Pinel insists much upon this lesion, and upon the anatomical characters, as one of the principal points among the lesions observed on the dead bodies of those who have died in the different epidemics of mucous fever. The state of the mouth, œsophagus, stomach, and intestines, says he, is particularly worthy of notice in the affection of the mucous membrane of these parts. Nothing has been more common than to find aphthæ in the pharynx—that is to say, a detachment, in certain places of the epidermis which covers the mucous membrane.* It is true that there exists, at the same time, in these patients, a similar alteration of the follicular apparatus of the intestines; but we can point out cases resembling these in young infants who have not experienced any febrile symptom. We will note this fact now, and examine it more fully hereafter.

When the aphthæ are small in number, a few consecutive symptoms present themselves; but this is not the case when they are confluent. The child is then pale, quickly becomes thin, has a diarrhœa more or less copious, and vomits every thing that is given. These occur when the disease has spread to the œsophagus, stomach, and intestines—the most frequent and fatal complications. There are also often seen regurgitations and eructations which diffuse an acid odor, attributed to the milk with which the child is fed, or which it sucks, not being digested by the diseased stomach. This acid odor is analogous in respect to that of milk changed by heat or vinegar. It appears to me more rational thus to explain the acid odor of the matters vomited or voided by the child, than to seek for causes in the acid or alkaline nature of the fluids, explanations which are not adopted at the present day. Is it to the acidity of the humors that the acid odor of the indigestible substances vomited by one

* *Nosogr. philos. t. 1. p. 130.*

who has indulged in too copious a dinner, or who has been jolted in a carriage, or rolled in a ship, is to be attributed?

If one may judge from the cries, wakefulness, and restlessness observed in children affected with aphthæ, this disease is not without pain. When the inflammation is propagated to the pharynx, and produces a swelling of the glands and an inflammation of the trachea, the cry of the child is sensibly altered, and it is doubtless as Gardien observes, that children manifest their pain sooner by the harsh or hissing cry than by their tears.* I shall hereafter examine the question of the existence of aphthæ in the trachea.

Treatment.—The therapeutic means advised by authors, in the treatment of aphthæ of the mouth, have varied according to the particular opinion of each upon the nature of the disease. For our part, seeing nothing more in it than an inflammation of the follicular apparatus of the mucous membrane of the mouth, we advise, in the first place, an antiphlogistic course. Yet as there are among the means advised, according to particular views, some medical agents capable of advantageously modifying and overcoming this inflammation, we will but perform our duty in pointing them out.

When aphthæ exist in a mild form, it will be necessary to wash the mouth with a piece of lint dipped in a decoction of marshmallows, barley-water, or milk and water. The vapor from a decoction of marshmallows or simple water, is also a useful remedy.

The general condition of the constitution of the child, and its causes, unhealthy air and bad diet, should be borne in mind. We often see infants artificially fed, suddenly acquire a good condition upon being placed in the care of a good nurse, and alter from a state of weakness and decay to which they had been reduced by insufficient or bad food: it will be necessary then to remove from infants affected with aphthæ, all the causes capable of favoring in them the predominance of the lymphatic system, in having, at all times, a proper regard for the condition of the digestive organs, and not irritating them by the internal administration of tonics.

When the aphthæ remain stationary, or are confluent, and re-

* *Traité complet d'accouchemens, etc., t. 4.*

sist simple antiphlogistic means, then it would be well to substitute acidulated gargles for emollient drinks. A mixture of barley-water and honey of roses, with a few drops of sulphuric acid, may also be used with benefit. In order to change the mode of irritation, and to dispose the inflamed surfaces to cicatrize, it will be advantageous sometimes to touch the ulcerated part with a piece of alum. Aretæus long since advised the use of alum as a topical application, in the treatment of chronic inflammation of the mouth and throat. It should always be used with caution, and employed alternately with demulcent gargles and no irritation produced beyond what we wish to obtain by this therapeutic agent.

I will not speak of other stimulating means, such as borax, sulphate of zinc, etc., because alum, which is innocent if cautiously used, will accomplish the same end. Gargling with chloride of soda, as advised by Guersent in muguet, should not be neglected in this disease.

If the child, by its cries, gives evidence of excessive pain, a little syrup of poppies ought to be added to the gargles, in the proportion of one to two drachms to two ounces of mucilage or gum-water. As to tonics, emetics, and purgatives, it appears impossible, by the internal use of them, to obtain any exclusive or general result. We will return to the consideration of their employment, when the history of the phlegmasiæ of the digestive tube becomes the subject of our remarks, when this complication will be examined. If aphthæ should become gangrenous, the treatment recommended in the article on gangrenous stomatitis, must then be adopted. If they are complicated with a cutaneous affection, we should endeavor to ascertain and establish its characters, in order to treat it according to its nature, progress, and the indications it presents.*

ULCEROUS STOMATITIS.

Besides the ulcerations which succeed the disorganization of the follicles, there often exist both in new-born infants and in those a little advanced in age, ulcerations in the mouth of a different character. These ulcers occupy indifferently every part

* See Appendix.

of the buccal cavity. I have seen them on the frœnum of the tongue, at its base, and on the internal surface of the cheeks, and on the palatine arch; they may occur in different ways. As these ulcerations have been, and still are, confounded with aphthæ, I think it will be well to begin their history by the detail of a few cases.

CASE X.—*Gastro-enteritis, ulcer at the base of the tongue.*—Chabert, a male child, aged eleven days, of strong constitution, but pale, and a little emaciated, entered the infirmary on the tenth of April, 1826. He had a slight coryza, and a diarrhœa of green discharges. The abdomen was distended with gas; there was no fever. A tisan of rice, and injections of starch were administered. On the thirteenth, the diarrhœa ceased; the buccal membrane became red and dry; the tongue exhibited at the base a sensible tumefaction; the cry of the child was painful without any alteration in the tone. (*Gummed rice water, emollient gargles.*) On the fifteenth the diarrhœa returned with increased violence. The discharges were no longer green, but were liquid, frothy, and white. The child soon became atrophied; the centre of the tumefaction at the base of the tongue softened, and became yellow. On the sixteenth, emaciation had made great progress; the pulse was feeble; the skin discolored and dry, the inferior extremities were infiltrated, the abdomen very much distended, the diarrhœa continued, and the base of the tongue exhibited an elliptical ulceration, the borders of which were depressed, and the centre red and sanguinolent. This ulceration spread more particularly towards the left lateral portion of the base of the tongue. (*Gummed rice water, starch injections, emollient gargles.*) The child died during the night.

Post mortem examination.—Œsophagus healthy; stomach contracted, with red points and ridges on its surface; small intestines healthy, but the large presented a general discoloration and softening of their internal membrane. The circulatory and sensitive apparatus were healthy.

This ulceration was doubtless caused by acute inflammation of the membrane of the tongue, and differed essentially from the ulcer arising after aphthæ.

CASE XI.—*Ulcer of the arch of the palate.*—Derpois, a boy aged nineteen days, entered the infirmary on the 1st of February, 1826.

This child was small, thin, and pale; his skin hot, and pulse scarcely perceptible; his tongue very red at the extremity, but was white at the base; there was a slight tumefaction of the abdomen, copious diarrhœa, and frequent vomiting. (*Gummed rice water, cataplasm to the abdomen.*) On the 4th of February, the mucous membrane of the arch of the palate became tumefied, and very red at a circumscribed point; the general condition of the child was not altered. (*Same treatment, emollient gargles.*) On the 8th, the diarrhœa increased; the child was excessively pale, slightly agitated, often drowsy, and had rapidly become emaciated; the mucous membrane of the mouth presented an irregularly rounded ulceration; its edges were tumefied, hard, and red, and the centre yellow; the centre was about two lines in diameter. On the 12th, same condition; the ulcer remained indolent; nothing used but a wash of marshmallows. The child vomited almost every thing that was given. On the 16th he died.

Post mortem examination.—Complete marasmus, and an exsanguined state of the integuments. The mouth exhibited, besides the ulceration mentioned, an intense redness of every part of the buccal membrane, and a very strongly marked tumefaction existed at the base of the tongue and the lateral parts of the pharynx. The œsophagus was injected; the internal surface of the stomach, which contained coagulated milk, exhibited a rosy hue; the duodenum was healthy. From the middle of the jejunum to the ileo-cæcal valve, the internal membrane of the intestine was of a deep red, tumefied, and friable; towards the extremity of the ileon it was less red, but it was in a pulpy, softened condition. The large intestines were healthy. The other organs presented nothing remarkable.

The ulceration in this instance was much more advanced than in the preceding case. It was evidently the result of inflammation of the buccal membrane, which was found very much inflamed, particularly about the pharynx.

In dissecting the body of a child, whose case I had not examined during life, I found upon the internal surface of the lower lip, and on its left side, a large superficial ulceration, the irregular edges of which were tumefied, and upon the sides a curdy excretion, analogous to that sometimes seen in aphthæ. I have often seen the frœnum of the tongue destroyed by similar ulcers, cases of which I shall give hereafter. Denis has observed a

softening of the mucous membrane of the palate, which, according to this author, almost always occupies the centre of the palate, on the median line. Sometimes it is situated on the outside of this line; the mucous membrane, red, inclining to a fawn color, is changed to a kind of pulp. If it be raised, it will be observed that the edges of the ulceration are perpendicular, and that the bottom of the ulcer is formed of the bone apparently in a healthy condition.* M. Baron has told me that he has several times seen this disorganization, an affection which I have not as yet happened to meet.

The treatment of these ulcerations differs but little from that of aphthæ; when they resist the use of emollient gargles, and continue to increase, we should then endeavor to arrest their ravages by touching them with mild escharotics; and if they terminate in gangrene, recourse must be had to the active measures pointed out hereafter.

The softening of the mucous membrane is a very serious alteration, and one which I believe it is impossible to remedy.

PUSTULAR STOMATITIS.

I give this name to the inflammation which is developed during the course of small-pox, producing pustules analogous to those on the skin. As it presents no particular indication, and as the treatment is comprehended in that of the cutaneous phlegmasiæ, I merely mention here this variety of buccal inflammation, the development, progress, and termination of which is connected with the development and progress of variola.

I have not been able to establish exactly the seat of this alteration, which, from the analogy it bears to the cutaneous inflammation accompanying it, I regard as pustular.

GANGRENOUS STOMATITIS.

Gangrene of the mucous membrane of the mouth, may occur in various ways. It may be the termination of the various kinds of stomatitis already described, but particularly of the follicular variety. It may be developed as an effect of some particular alteration arising, in the first place, in the soft parts of the buccal pa-

* Denis, loc. cit. p. 100.

rietes, the causes and nature of which we will endeavor to state.

Gangrene which shows itself on the ulcerated points of the mouth, has been pointed out by a number of authors. This is what is ordinarily designated by the name gangrenous aphthæ. I believe also that aphthæ have been sometimes regarded as gangrenous when they were not so, as has already been observed.

When aphthæ become gangrenous, their edges shrink and assume a burned, torn, and flabby aspect; then a brown eschar often forms in the centre, which soon detaches itself, leaving a granulated surface of a vermilion color. In place of an eschar, the centre of the ulcer sometimes gives off a creamy substance of a brown color, and of a very evident gangrenous odor. The surrounding parts tumefy, assume a violet aspect, become softer, and are easily depressed. In the mean time, from the mouth of the child, always half open, there flows a ropy saliva. The face becomes pale; the patient remains drowsy, and sinks without having exhibited any febrile reaction or cerebral excitation. The pulse remains always extremely feeble, and the skin is remarkable for its pallidness and insensibility. To these symptoms there are often added vomiting, diarrhœa, and distention of the abdomen, and sometimes hiccup and frequent eructations.

This termination of aphthæ is extremely fatal, for it happens usually at a period when the child, wasted by the previous phlegmasia with which it was affected, affords no opportunity for the administration of therapeutic agents demanded by its situation.

As soon as the gangrene is formed, it will be necessary to touch it with gum-water, slightly acidulated. Should this application effect no alteration in the aspect of the ulcer, sulphuric or muriatic acid must be used. In order to apply them in the easiest manner, a glass capillary tube may be used, immersing one end in the acid, and drawing up one or two drops, which may afterwards be deposited on the surface of the ulcer, with the end of the tube. After the application of these acids, and when the eschar is detached, it will be necessary to touch the remaining gangrenous parts with a stick of nitrate of silver, sharpened at the point; for by using the acid again, it might touch the parts deprived of the eschar, and which are then in a state of extreme irritability. It is much easier to moderate and limit at

will the action of nitrate of silver, which however does not act very deeply if it be used at first.

Our remarks on gangrenous aphthæ, apply to all ulcers of the mouth which assume that character.

I shall now consider gangrene of the mouth properly so called, that which does not follow any well characterized inflammation, but appears to be brought about by some particular alteration of the parietes of the mouth.

This disease has, for a long time, attracted the attention of the physicians; but it is not until quite recently that it has been studied with much attention, and it is to the works of MM. Baron, Guersent, Jadelot, and Isnard,* that we are indebted for positive data on this disease. When the commentaries of Van Swieten on the aphorisms of Boerhaave are examined, it will be seen that this physician has spoken particularly of the destruction of the tissues of the gums by gangrene or softening, an alteration which will be examined below, and that he has not described with precision the gangrene of the mouth, as we, at the present day, understand by the disease, and as is described in the works of the authors above mentioned. Van Swieten says, "*Si autem multum tumeat gingiva, simulque admodum rubeat, validæ, inflammationis signum est quemadmodum in gangrænum satis citò terminatur, precipuè si acrior humorum indoles simul adsit.*"† In gangrene of the mouth, which we propose to describe, not only may there be destruction of the gums, but also of the mucous membrane of the parietes of the mouth, in every part of this cavity.

In studying this affection, we must not confine ourselves solely to the time of the appearance of the eschar or point of disorganization, which constitutes the principal characters of this disease. It is necessary to ascend higher, and to examine well the morbid condition which precedes and leads to the gangrene.

We have seen, in treating of the diseases of the skin, that in young infants, the feet, hands, and labia pudendi, were subject to indolent swellings, which frequently, in place of disappearing,

* Baron, *Mém. sur une affection gangreneuse de la bouche*. Bulletins de la faculté. Isnard, *Dissertation sur une affection gangreneuse particulière aux enfans*. Paris, 1818.

† Van Swieten, in *Boerhaave Aphor. com. morbi infantum*, t. 4.

terminate in gangrene. The same phenomenon occurs at the anterior orifice and at the parietes of the mouth of some infants. Indeed those children that are born feeble, and in a kind of stupor which denotes a low degree of vital energy, often exhibit indolent swellings, of which the following case will furnish an example.

CASE XII.—Adele Montaban, aged one month, has been nursed at the hospital from birth; was of a very feeble constitution; color pale, abdomen habitually distended; and she vomited the milk she had taken. She entered the infirmary on the 4th of February, 1826. Besides the signs already indicated, she presented the following symptoms: the drinks vomited shortly after being taken; edges of the tongue red; abdomen tympanitic; diarrhœa of yellow discharges; redness about the anus. (*Gummed rice water, emollient fomentations to the abdomen, milk and water.*) She continued for eight days in the same condition. On the twelfth, some spots of muguet appeared on the surface of the tongue; emaciation made rapid progress; the child exhibited a chlorotic paleness; and the face was swelled and infiltrated. On the fifteenth, infiltration of the face had much increased, and a well-marked tumefaction of the upper lip was also observed, which was thereby half raised, leaving the mouth partly open; the eyelids also were slightly œdematous. The general condition of this child was remarkable for nothing except the universal sinking and prostration which it presented; there existed no febrile action. (*Gummed rice water, milk and water.*) On the eighteenth, the diarrhœa and vomiting had ceased; the face and lip in the same condition. On the twentieth, the tumefaction of the upper lip was much greater, the border of which had become of a violet color; general coldness; the cry, which before had been feeble, was not now heard; the pulsations of the heart were very slow, irregular, and trembling; the child died on the night of the twentieth.

Post mortem examination.—Upon dissecting the upper lip, there was found a citron-colored serum mixed with drops of blood, infiltrated through the subcutaneous cellular tissue; the membrane on a level with this part was tumefied and very soft; the inferior lip also presented a slight œdematous tumefaction. On the frœnum of the tongue there was a superficial ulcer, which had not been observed during life. The glottis was the seat of an œdematous swelling, and the œsophagus that of a sanguineous congestion. The stomach was

healthy; the duodenum, which contained a viscid fluid of the color of bistre, exhibited a number of red striæ. The remainder of the small intestines were only of a slight rose color; yet the internal membrane was tumefied and friable. The colon presented some red striæ, and between them, several of a slate color. The liver and the two lungs were gorged with blood. The foramen ovale was still open, but the ductus arteriosus obliterated. The vessels of the periphery of the brain were engorged, the ventricles containing but little serosity.

This case is remarkable, inasmuch as the external condition of this child, the paleness and sinking, appeared to indicate the employment of tonics, which must have been injurious to the digestive passages in their inflamed condition. Perhaps this general sinking might be attributed to a sanguineous congestion of the principal organs of the circulatory apparatus. Be this as it may, we ought to note the œdematous swelling of the upper lip, which, if the death of the child had not occurred, would doubtless have led to the disorganization of which the following cases furnish us examples.

CASE XIII.—Rose Camusot, aged twelve days, born feeble and wretched, wasted daily while in charge of the nurse to whom she was confided. She was brought to the infirmary on the 9th of July, 1826. She was pale, cried aloud, and was at times drowsy. The temperature of her skin was natural; the pulse beat from seventy to seventy-two; the pulsations were small and sometimes indistinct. (*Milk and water, with barley-water.*) In the same condition until the fifteenth. Emaciation then advanced; great paleness; tongue very red and dry, and covered with spots of muguet at the edges. (*Gargles of marshmallows, milk and water.*) On the fifteenth, the muguet was more widely spread on the surface of the tongue; all the lower parts of the face were œdematous, and the lower lip became the seat of a considerable tumefaction, in consequence of which it was turned downward; the skin covering it had an oily appearance. The mucous membrane was, as it were, ecchymosed at the internal part of this lip. (*Gargles of a decoction of cinchona, acidulated, milk and water.*) On the twentieth, the swelling of the lip had made great progress; a large violet spot, analogous to what is known by the name of nævus, showed itself on the integuments of the lower lip, which was quite hot to the touch. The pulse was

slow and almost imperceptible. The child, in a state of complete exhaustion, had neither vomiting nor diarrhœa. This state continued until the twenty-second, and in the same night she died.

Post mortem examination.—When the lower lip was dissected, an infiltration of bloody serum was found, the accumulation of which gave to the tissue of the lip a thickness of about four lines; the mucous membrane began to detach itself on the internal surface of the maxillary bone. But slight traces of muguet continued on the tongue. The stomach exhibited a violet color; the internal membrane was tumefied and friable; all the intestinal tube was covered with red striæ, the mesenteric ganglia were redder and more tumefied than in the natural state. The lungs were healthy; the ductus arteriosus was obliterated, and the foramen ovale still remained a little open; the brain was perfectly healthy.

We have seen in this latter child, an erosion or an ulceration of the mucous membrane of the mouth follow the œdematous tumefaction of which the walls of this cavity had, for some days, been the seat. We shall see, in the following case, gangrene making wide spread and rapid progress.

CASE XIV.—Delosane (Victoire,) aged nine days, entered the infirmary on the 5th of January, 1826. General œdema was present; color of the integuments of a medium tint; pulse full, irregular, and a little frequent; the cry but little developed, and possessing a slight huskiness; the chest, on percussion, returned an obscure sound on the right side. (*Pectoral infusion, sweetened milk and water.*) From the fifth to the eighth, no remarkable change was manifested, except that emaciation had commenced. On the eleventh, the left side of the face was sensibly swelled; the gums of the same side tumefied; the cry was feeble, and a constant discharge of a mucous sanguinolent fluid took place from the mouth. There was not the slightest febrile action. (*Sweetened barley-water, emollient gargles.*) On the twelfth, the swelling of the face had made frightful progress, and the child was much disfigured; the cry smothered; œdema of the limbs continued; the mouth, which was almost continually filled with bloody mucus, emitted an odor of rotten eggs. The tumefaction corresponding with the gums, had not made as much progress as that of the face. M. Baron directed my attention to the smooth and oily aspect of the œdematous part of the face; in the middle of this tumefaction appeared a round spot about the size

of a ten sous piece, of a dull red. In the centre of the cheek was a small part much harder than the other parts. (*Acidulated gargle, milk and water.*) On the thirteenth, a round eschar, brown in the centre, and yellow at the borders, appeared at the internal surface of the swelled cheek, and extended to the lower part of the gums, near which there existed a deep erosion, the edges of which were brown, and appeared as if burned. It exhaled from the mouth a well-marked gangrenous odor. The red spot on the exterior of the cheek had assumed a violet color. The child was much sunken, quiet, and without fever. On the fourteenth, the eschar was enlarged; it had invaded the whole of the cheek, on the internal surface of which it was soft, brown, and surrounded by a circle of a violet red. The erosion of which I have spoken, was replaced by a sinus of some depth, formed by the sloughing of the mucous membrane. From this sinus, there issued a brown, bloody, viscid matter. The child died at night.

Post mortem examination.—The face still presented the same œdematous tumefaction which was observed during life; the eschar in the centre of the cheek was of the consistence of cream, and separated in shreds; the tissue of the cheeks exhibited a lardaceous aspect; the gums were entirely destroyed by gangrene at the corresponding part; the inferior maxillary bone was bare; the œsophagus was injected; spots of red were found in the stomach; general injection of the capillaries of the small intestines; the large intestines were healthy. I dissected the arteries, veins, and nerves going to the cheeks, without finding any thing worthy of remark in them.

There were also solid cellular adhesions between the pleura costalis and pleura pulmonaris of the right side; the lungs of this side crepitated. The right lung was much infiltrated with blood in the inferior lobe, while it crepitated at the superior part.

The pericardium was a little distended, and contained nearly two spoonsful of puriform serum; the internal surface of the pericardium exhibited a slight red; the membranous covering of the heart was very red, and was spread over with a pseudo-membranous exudation about the thickness of letter-paper; this exudation was of greater thickness at the auricles than at the ventricles; the tissue of the heart was dense and very pale; the fœtal openings were obliterated. The brain exhibited a general congestion.

This case presents several interesting points, such as chronic pleurisy and acute pericarditis; but in order to confine our-

selves to the subject before us, let us fix our attention particularly on the progress of the gangrene of the mouth, and let us notice—1st, The œdematous swelling of the cheek, the skin of which had assumed an oily aspect; 2dly, The indurated spot which showed itself in the centre of the engorgement, and which without doubt resulted from the commencement of the disorganization of the cellular or adipose tissue; 3dly, The muco-sanguinolent discharge; 4thly, The violet spot replaced by an eschar; 5thly, and lastly, The extensive disorganization of the cheeks and of the tissue of the gums in the spot corresponding with the eschar, which had presented all the characters of gangrene, and which first showed itself at the point of contact of the buccal parietes and the inferior maxillary bone.

M. Baron, in his excellent memoir on the gangrene of the mouth, inserted in the *Bulletins de la Faculté de Médecine de Paris*, has also pointed out these various stages of the disease now under consideration, and to which practitioners ought carefully to direct their attention; for by closely observing their approach, all the evil consequences which follow may be prevented, and this disorganization encountered before its arrival at a stage which, for the most part, is incurable and mortal.

There may be two well-marked stages in this disease:—1st, An œdematous, circumscribed tumefaction, characterized by an oily aspect of the skin, and by a central body more or less hard, on which there is sometimes an obscure red spot, either on the internal or external surface of the buccal parietes; this is the first stage, and in young infants is not accompanied with fever or any symptom of reaction; 2dly, This central part presents an eschar which usually forms from within, the mucous membrane becomes disorganized, the bones are laid bare, all the soft parts, even to the periosteum, mortify and separate in shreds, at the same time that the mucous or bloody matter, mixed with the remains of the gums or sides of the mouth, flows out, exhaling an infectious odor; this is the second stage.

Gangrene of the mouth must not be confounded with malignant pustule, for, as has been well observed by Rayer, the gangrenous inflammation commences in the interior of the mouth, and from thence spreads to the skin. There is nothing to prove the contagiousness of this disease; it is usually observed in one

patient at a time, in an hospital, even when surrounded by numbers of other children.

It is difficult to explain the cause of this gangrene; nevertheless it is a fact which ought to be taken into consideration, that œdema and indolent tumefaction always precede the formation of the eschar. Is it because the blood no longer circulating in the capillary vessels, the lymph and serum engorge and spread through the cellular tissue, and the parts which the blood should nourish become thereby disorganized? I cannot answer this question positively; but I can at least observe that this gangrene, far from proceeding from inflammatory action, is, on the contrary, the result of an indolent engorgement, analogous to that which constitutes anasarca. In the latter case, the parts of the body which are compressed readily become gangrenous; now the internal surface of the mouth, the walls of which are thus tumefied and infiltrated, become gangrenous at first at the part where it is exposed to pressure, opposite the horizontal part of the jaw and the dental arch. It appears, then, that gangrene is the effect of œdematous tumefaction, the cause of which we will now endeavor to ascertain.

It is well known with what facility the cellular tissue of newborn children is infiltrated, until so great a tumefaction is produced as to have induced several authors to call the œdema by the name of induration of the cellular tissue. This disposition to serous infiltrations, at the same time exposes them to indolent engorgements and to gangrenous phlegmasiæ of the skin and extremities. The frequent occurrence of gangrene in the fingers, toes, and vulva of very young infants, has already been alluded to when treating of the diseases of the skin. Now, does not this species of alteration coincide in the frequency of its occurrence with the predisposition of infants to œdema?—a predisposition which, without doubt, arises from the actual state of the circulatory apparatus, the exercise of which is not as yet perfectly regulated; and probably also from the superabundance of serum in the blood of young infants. This would appear to be the cause of œdema, which, in its turn, becomes the predisposing cause of gangrene.

If we will now consider the development of gangrene of the mouth in children more advanced in age than those whose cases

have been detailed above, we shall see that this disease shows itself principally in such children as experience a general infiltration which so frequently follows cutaneous phlegmasiæ, as varicella or rubeola. They are then in a morbid condition analogous to the usual state of new-born infants during the first months of life. Among the children that are the subject of M. Baron's essay, several had had rubeola and were affected with gangrene of the mouth, at the same time that the face and limbs were œdematous.*

It is not without a proper motive that I have entered into these considerations on the causes and nature of the diseases of which we are now treating, for these data may enlighten us in the choice of the proper treatment.

Treatment.—The treatment should vary according to the periods of the disease; when there exists a general infiltration, it will be necessary to meet it by the means pointed out in the chapter on œdema, or induration of the cellular tissue; if this infiltration should become local, if the face, for example, should continue solely to be its seat, the removal ought to be attempted by aromatic or dry frictions. If the œdema become circumscribed, if it exhibit a nucleus of engorgement harder than the other parts, more energetic measures must be adopted, particularly frictions with ammoniacal liniment: the cheek should be covered with compresses saturated with a weak solution of hydrochlorate of ammonia. I believe it will be imprudent to make use of mercurial frictions on account of the liability of the buccal membrane to ulceration from its use, and it is well known that when this membrane is once ulcerated, gangrene makes extraordinary and rapid progress.

Lastly, if at the interior of the mouth a slight erosion, and on the exterior a violet ecchymosis, should appear, it will then be necessary to resort to extreme measures, and cauterize the central part of the tumefaction, either with the butter of antimony introduced to the bottom of a crucial incision made on the out-

* A similar affection may also be developed in the genitals. They have been observed under circumstances analogous to those which appear to influence the commencement and progress of gangrene of the mouth. We will be contented to point out at present the coincidence. In the article on the diseases of the generative organs, we will cite in its support a remarkable example of gangrene of the vulva.

side of the cheeks, or, what is still better, with the actual cautery. This latter method of cauterization appears to M. Baron preferable to potential cautery, and he insists on its employment as the sole means of restoring the health of the patient; it will be necessary to have recourse to it as soon as possible, for if we await the progress of the disease before deciding on its employment, it will be necessary to destroy a great part of the cheek, and thus expose the child to the certainty of having a much larger cicatrix. The mouth should, at the same time, be washed with honey-water, or acidulated barley-water.

When the eschar is detached, or when it has been destroyed by caustic, it is well to have recourse to emollient cataplasms and lotions, in order to moderate the inflammation.

As to general treatment, I attach less importance to it, because the slowness and uncertainty of its action will never compensate for the advantages of caustic applied directly to the seat of a disease the progress of which is of so frightful a nature. The strength of the child should at all times be sustained with a mixture of equal parts of milk and broth, or by giving a few spoonful of Malaga wine in the course of the day. Internal stimulants should be employed with caution, and the practitioner must not lose sight of the fact that, in spite of the apparent feebleness of the subject, the digestive tube is sometimes the seat of an irritation and inflammation, which may be much exasperated by the use of stimulants. Yet, if the abdomen be without pain, if there be constipation, it would be well to try the effect of calomel, or of injections composed of a solution of sulphate of soda and olive oil, or castor oil. As the object is to augment the intestinal secretion, and to establish a revulsion on a part of the digestive passages opposite to that occupied by the disease, calomel and sulphate of soda ought to be preferred; the former taken by the mouth in syrup, the latter given in injections.*

§ IV. DISEASES OF THE PARTS CONTAINED IN THE MOUTH.

GLOSSITIS.—Glossitis is an inflammation of the fleshy part of the tongue. I have not observed this disease in infants at the breast. I have already spoken of ecchymoses, which may often

* See Appendix.

be met with at this age in the tissue of this organ, and which must not be confounded with the traces of inflammation; neither should the hardness of the tongue, which is seen almost always in children after death, be regarded as a pathological condition; this hardness is the result of a sort of cadaveric rigidity, or a kind of spasmodic contraction of the muscles of the organ, which occurs at the approach of death. As to the inflammation of the mucous membrane of the tongue, its history is contained in that of stomatitis; on this account, I abstain from treating the subject separately.

SECTION II.

OF THE DEVELOPMENT AND DISEASES OF FIRST DENTITION.

ART. 1.—Of the development of the Teeth.

In general, there is great importance attached to the pathological phenomena connected with the development of the first dentition. It has been customary to attribute them to the effort that nature appears to make for the protrusion of the teeth: it is in the state of the gums, in the inflammatory action which takes place there, in the pruritis, congestion, and pain, that the causes of the various affections to which a child is liable at this age are sought. I believe that this manner of viewing the subject is too exclusive, and that it is wrong to admit these causes in so general a manner: and I propose to show that there is another reason for all these symptoms, which it is necessary to consider, in order to treat methodically and successfully young infants that are affected with symptoms usually attributed to slow, painful, and difficult dentition.

In order to demonstrate the views I entertain, it is necessary to examine what takes place anatomically and physiologically in the development of the germ of the teeth, and of the teeth themselves, from their first appearance until their protrusion through the gums; considering afterwards the pathological phenomena of dentition.

There exists between the development of the dental follicles, and that of the maxillary bone, some very remarkable relations.

In the embryo of about three months, the alveolar borders of the two maxillary bones consist in a uniform groove, narrower

towards the median line than towards the molar portion, enclosing a number of follicles which, without being joined together, are yet grouped so closely that they appear to form one many-lobed mass. From four to five months these lobuli, which are the dental follicles, are more distinct, and in place of being grouped together, they form a kind of elongated cluster, composed generally of eight distinct follicles; they are all contiguous, and may be raised from the groove of the maxillary bone, and if care be taken in the dissection, the artery and nerve may be raised at the same time with them. If the common alveolar cavity be then examined, there will be seen on the two lateral parietes, small vertical projections, corresponding to the slight furrows which separate the follicles, the adhesion of which could not be called in question, since they can be raised together, and cannot be separated without destroying their reciprocal adhesions. In proportion as the fœtus approaches the period of birth, these commencements of the alveolar partitions become more evident; these projections meet together and unite, forming so many segments or transverse partitions, the intermediate spaces between which constitute the alveoli. It has been remarked that all the dental follicles have a globular form; but from the moment the alveoli are formed, they cease to continue of that shape, the osseous plate cuts them, if we may say so, into several small separate follicles, which are attached to the bottom of the maxillary groove by a filament of nerve and a branch of an artery; these follicles receive their form and direction from the cell in which they are enclosed.

At birth, these are generally found in the lower and upper jaw, and particularly in the lower five well-marked partitions; the first two spread laterally, and are destined to receive the two incisors; the third, narrower and generally oblique from below upward, and from behind forward, are squeezed between the first two and the fourth; it contains the canine teeth; finally, the fourth, broader and rounder, is the alveolus of the first molar. The partition of this alveolus opposite to that which separates it from the canine tooth, is found at the period of which we are speaking in the middle of the space comprised between the symphysis of the lower jaw and the coronoid process; so that the fifth alveolar cavity of a new-born child extends from this intermediate point beyond

this process—that is to say, almost half the distance comprised between the process and the maxillary symphysis. In the remainder of the dental groove, there is already to be seen the rudiments of a partition which is to separate it into two sections, for the second and third molar teeth. At the bottom of the new alveoli, which are not yet perfectly formed, the dental artery and nerve are to be seen directing their course towards the internal part of the mouth and sending branches to the dental germs.

Our remarks as to the formation of the dental alveoli will apply particularly to the lower jaw. The same phenomena occur in the upper jaw, but the dental groove being narrower and shorter, the alveoli form in a manner more irregular and less distinct, although in the main the same process takes place.

But let us see what occurs in the germs of the teeth during the process of the ossification of the jaws.

Each follicle, we have said, is isolated in its alveolus ; this follicle, the structure of which it is somewhat difficult to see, exhibits more evidently at this time the elements of its composition.

When the groove was single it was lined with an extremely thin membrane, which was at the time joined to the follicular mass. In proportion to the formation of the alveolar sections this membrane is divided, and forms, in remaining united with the internal surface of the alveoli, what is denominated alveolar periosteum.

The follicle is composed of two membranes, difficult to see, it is true, but described by J. Hunter, Fox, Black, Bichat, and Meckel. Between these two membranes, says Meckel, is found a fluid more or less abundant in proportion to the age of the fœtus. Meckel has well described these two membranes, and I have been able to establish, with the greatest facility, on the dead body, the description he has given. “The external layer is more spongy, looser, thicker, and softer than the internal. It is very distinctly continuous with the gum ; whence it is easy, in the fœtus, especially during the early months of pregnancy, to extract the alveoli attached to the gum.

“The internal layer is harder, but thinner, than the external. We can demonstrate that it forms a sac entirely distinct from the external and from the gum. Its relations with the teeth are more intimate than those of the external layer, for it is the proper or-

gan of formation. The vessels of the teeth are distributed there much more evidently, and when injections succeed, it appears entirely red."*

This double sac encloses at first nothing more than a red or yellow fluid, but by degrees there is formed in the centre a point of much greater consistency, which, it is said, is itself enveloped in a thin membrane, and which constitutes the germ of the tooth. In proportion as the follicles become more developed, and the alveolus begins to enclose it, the germ is more distinct; and, accommodating itself to the cell which contains it, begins to take the shape of the tooth by which it is to be succeeded. Lastly, about the end of five months, at the superior part of the germ of the incisor teeth, there appear two or three small red indurated points, almost always situated at the side. These small points soon unite, thus forming a species of bifurcation, of which the incisors sometimes exhibit a trace on their protrusion. Afterwards a similar point appears at the summit of the follicle of the canine teeth, and several others on those of the first molar.

Small scales quickly succeed these primitive indurations, solitary in the incisors and canine teeth, multiple and distinct in the first molar. These scales already present an osseous consistence; they gradually enclose the pulp, to which they are solidly adherent, as they increase in size. It is evident that they are the product of a kind of secretion taking place on the surface of the dental germ. This ossification soon makes progress from above downward; and when it has taken the form of the crown of the tooth, it then exhibits a depression or circular neck, below which it elongates in the form of a root.

Hitherto, we have seen that it was at the external surface of the germ that the ossification commenced, proceeding from within outwards, so that the little osseous crown encloses in its cavity the pulp or germ, and is enveloped by the double membrane which formed the walls of the dental follicle. The internal layer of this double membrane, applied directly to the point of ossification, secretes, according to the greater number of anatomists, the enamel of the teeth.

* J. F. Meckel, *Manuel d'anat. général, descript. et pathol.* traduit par A. Gourdan et G. Breschet. Paris, 1825.—[V. English translation by A. Sidney Doane, M. D., v. 3, p. 231.—S.]

Thus the phenomena of the ossification of the jaws, and those of the development of the teeth, are simultaneously affected during the continuance of the fœtus in the uterus. From this period, the disposition, form, and progress of the teeth, appear to be governed by the development of the maxillary bones, and the changes which occur in the dental groove. This assertion is supported by the well-known fact that the alveoli are much sooner formed in a distinct manner in the lower than in the upper jaw; and it is in the lower jaw that the teeth are developed first, and appear sooner on the outside of the gums at the time of dentition.

Until this time, the teeth did not require to be separated from each other, and to have, as we may say, a separate existence; but the development of the alveoli has placed them in a suitable condition for such a change. We shall now see by what mechanism they shoot up from the jaws, pierce the gums, and protrude into the mouth.

There have been two different opinions presented on the subject of dentition. M. Serres has advanced the idea of the existence of some force exterior to the tooth—a species of gubernaculum—drawing and conducting it to the outside of the gums.* Other authors have found the cause existing only in the evolution of the tooth. For my part, I have not seen the gubernaculum spoken of by M. Serres, and am persuaded that this protrusion of the teeth depends both on their evolution and the concomitant development of the maxillary bones; it is then a phenomenon almost of a mechanical nature, which has been vainly sought to be explained by brilliant theories, but which simple anatomical observations have enabled us to demonstrate.

Indeed, at the period of birth, the dental germs exhibit points of ossification which, with the exception of the canine teeth, are all situated on the same line, and do not pass the osseous border of the dental groove; the inferior extremity of the germ is not as yet ossified; it remains at this part soft and transparent, and the osseous cap appears to be held at the upper part of the groove by its adhesion to the alveolar periosteum which lines the inferior border of the gum. The gum is of a firm tissue, solid and dry

* *Mém. sur la dentition*, inserted in the *Mém. de la Soc. Méd. d'émul.*, t. 8.

enough to have been compared to cartilage, and at the place destined to be supplied with the teeth is sufficiently solid to fulfil, provisionally, their functions. Sometimes this border presents projections and depressions analogous to the teeth and the depressions which separate them. I have seen in a young infant these projections so evident, and possessing so distinctly the shape of the incisors and molar teeth, that it was said the child had fleshy teeth.

The tissue of the gums after birth gradually loses its consistence ; it becomes soft, and insensibly spreads in such a manner as to exhibit, in place of a continued border, a slightly depressed surface, which does not swell except when affected by inflammation. The opening in it for the passage of the teeth cannot be distinguished.

When the cervix of the tooth has acquired a determinate form, the root grows larger and reaches the bottom of the alveolus. The maxillary bone also making progress in its ossification, rises, as it were, to the root of the tooth, and soon there is nothing to be seen between the tooth and the bottom of the cell, except a small space occupied by the pulp, and in part lodged in the dental cavity. The two alveoli of the incisor teeth are found to be on the same plane, when they are examined sometime after birth. At four months this difference is still more evident ; the inferior maxillary bone at the median line grows rapidly in height and thickness, and appears to raise with it the first incisor, which, gradually entering in the gum, insensibly separates it, and in which it becomes imbedded. Finally, about the seventh, eighth, and ninth month, the first two lower incisors appear outside of the gum. The second incisor tooth shows itself much later, because the bottom of its alveolus being lower by a line, or half a line, than the upper, in order to reach its level, has to pass over a much greater space. I have now before me the lower jaws of four infants that have died at the usual time of the appearance of the first incisors ; in neither had the second appeared. On measuring the length of the four incisor teeth they were all nearly the same, having the same degree of ossification ; but the first appeared soonest, because the ossification of the jaw had produced an earlier elevation of the alveolus, so that there existed between them a difference of almost a line at the level of their

insertion : to make a comparison, the bottom of these two alveoli presented the same difference as two consecutive steps of a stairs.

The canine teeth do not appear immediately after, because they are much more deeply implanted, are confined, and situated obliquely in their narrow alveoli, and require some enlargement of the dental arch, and ossification of the maxillary bone, in order to obtain at the bottom of their cells a point of support necessary for their progress upward. But the first molars, the ossification of which has commenced early, and which are generally more superficial than the canine teeth, appear much sooner than they ; following the second incisor. Lastly, the canine tooth comes in its turn, completing the number of teeth which furnish the jaw during the first year of an infant's life. Dentition usually commences from the seventh month to a year ; this, however, varies much.

From these considerations, which are based upon the rigorous observation of facts, it results—1st, That the teeth are the product of secretion ; 2dly, That their development regularly follows the progress of the ossification of the maxillary bones ; 3dly, That their appearance outside of the gum results in part from the evolution of the teeth, and in part from the development of the ossification and enlargement of the alveoli and dental arch ; 4thly, That the cause of the successive appearance of the first and of the second incisor, then of the first molar, and afterwards of the canine tooth, is altogether mechanical ; that it resides in the more or less prompt formation of the alveoli proper to each of these teeth, and in the greater or less depth of their implantation in the maxillary bone.

From this view of the subject, it is not necessary to admit as a cause the *gubernaculum dentium* of M. Serres. This anatomist, moreover, considers it difficult to establish its existence in reference to the first teeth, but that it is easily discovered in the second dentition. It is not my business to consider the phenomena of the second dentition, but to confine myself to the appearance of the first teeth. I will, however, make one remark ; it is this—that the teeth of second dentition are less regularly ranged than those of the first. If, therefore, the *gubernaculum dentium* be not chimerical, it is at least very useless, since the teeth are ranged with less regularity at a period when it is more easy to

recognise the apparatus which directs them, than when the apparatus is so small that it cannot be seen.

As to the follicles which are situated in the thickness of the gums, and which M. Serres considers as destined to lubricate the parts through which the teeth pass, Meckel regards them as new formations produced by the irritation caused by the teeth, and in no respect differing in their nature from that of abscesses.* These follicles, which consist only of a yellow fluid, sometimes thickened, appear to me to be formed in the following manner: during the time the tooth is undergoing development, it presses on all sides the fluid and soft parts which the alveolus encloses; the fluid, which is still at the root of the tooth, and which is but the remainder of that which the dental sac contained before ossification, is crowded back, and lodges either at the lateral part or at the summit of the teeth. In the molar teeth, the crowns of which exhibit elevations and depressions, this fluid ordinarily lodges in these depressions in the form of small semi-fluid drops, irregularly round. When the gums are torn in the dead body of a child of the age of nine months, or a year, there is often found the small yellow bodies pointed out by M. Serres, and there is frequently discharged from the lateral parts of the alveolus a small quantity of viscous fluid, which appears to have escaped by the rupture which was made in the sac containing the germ of the tooth; so that it is altogether probable that the small collection of follicular appearances spoken of by M. Serres are neither follicles nor abscesses, but are the result of an effusion of superabundant fluid contained in the membranes of the germ. This effused fluid may also lubricate the soft parts which surround the tooth, and perform to a certain extent the functions attributed by M. Serres to these pretended follicles.

It is by considering the development of the teeth as I have done, in their relation to the progress of ossification of the jaws, and of the formation of the alveoli, that we are able to explain without hypothesis and without recourse to theories more brilliant than true, all the phenomena belonging to the appearance of the teeth. By studying dentition, therefore, in this point of view, M. Lévillé, in one of the best works which I think has

* Loc. cit. t. 3, p. 347.

been published on this subject, has explained with great clearness all the circumstances of this physiological phenomenon.* M. Delebarre has also made an approximation to the truth, in attaching the greatest importance to the relation between the development of the teeth and those of the jaws.†

ART. 2.—Anomalies of Dentition.

If all that authors had written on the aberration of the process of dentition should be recorded here, an extended chapter of absurdities would be the result, and on this account I shall merely point out the opinions which appear to be the nearest to the truth, and which anatomy and physiology alone can properly elucidate. The general anatomy of Meckel contains very important details on this subject.

The teeth present anomalies in their development ; that is to say, they may appear earlier or later than the period of first dentition, which is usually from the tenth month to one year. This, however, is of little importance ; neither should there be attached any to the irregularity with which they proceed from the gums. Sometimes children are seen born with teeth ; they are generally the incisors. This anomaly often coexists with a malformation of the face, and particularly with hare-lip and congenital division of the velum. It is also possible for the mouth not to exhibit the least anomaly, although furnished early with teeth. Such instances are found in the case of Louis XIV, and that of Mirabeau.

These teeth are generally of but short duration, because, being but superficially implanted, they become still less so in proportion to the development of the maxillary bone, and are on this account quickly shed ; at least, this is what I saw in a child brought in the month of June to the Hospice des Enfants Trouvés. It had two teeth, one of which was shed at the end of six weeks, and the other very soon followed.

* *Mém. sur les rapports qui existent entre les premières et les secondes dents, etc.* Mém. de la Société méd. d'émulation, t. 7 and 9.

† *Méthode Naturelle de diriger la seconde dentition.* Paris, 1826. See also the Mémoire of Miel, entitled, *Quelque idées sur le rapport des deux dentitions, et sur l'accroissement des mâchoires dans l'homme.* Mém. de la Soc. méd. d'émulation, t. 7.

If these teeth interfere with sucking, they should be removed; for it would be better for the child to be without incisor teeth until the period of second dentition, than to be deprived of the means of nourishment, without which its life would be endangered.

With reference to number, the teeth may present any anomalies at the time of first dentition; and it is not until the appearance of the second set that it is possible to find two rows in the same individual, as this results from the continuance of those teeth which, in their natural state, are but temporary. The anomalies of direction and of situation are of more frequent occurrence; even in children in the cradle, they are always the result of malformation in the superior or inferior alveolar arch. It may easily be conceived, that if the alveolus, the shape of which generally directs the growth of the tooth, be not readily formed in consequence of the narrowness of the maxillary bone, the tooth itself will also partake of the same deviation, protruding outside of the line of the other teeth, or at some distance from the dental arch. Albinus has recorded the case of an individual in whom there were two teeth of considerable length and thickness, that were hidden in the nasal process of the maxillary bone; their bodies were above, and the roots below.* When the primitive situation of the germ of the teeth is considered, we ought not to be surprised at the strangeness of their position, for they neither had the dental groove nor the alveoli to direct them in their development and progression. He also met with a tooth in the part of the maxillary bone which unites with the palate; and Sabatier once saw an individual who had two canine teeth in the same situation. It is worthy of remark, that almost all teeth that are thus separated from their natural position, are of this kind. Now, in the development of the germ of the teeth the canine are those which are the last to form; besides, they are often compressed between the other teeth. If the dental arch be not sufficiently spread to allow of a consistent place for the growth of the tooth, it may be easily understood how it can be pushed backwards and grow opposite to the place assigned to it by nature.

I do not know of any well authenticated cases of molar teeth

* Sabatier, *Traité complet d'anat.* Paris in —12, 3 v. t. p. 80.

being formed in the place of incisors. I am unable to conceive how this aberration can occur, because the alveolus of the incisor tooth is too narrow to enclose a germ of the form proper to the molar tooth; in every instance this tooth occupying an ununited alveolus, has a singular form, and is nothing more than an abortive molar.

Teeth may be wanting either in whole or in part. The former case is extremely rare; yet it appears to have been observed, since Borelli has given the case of a woman aged sixty years. If the primitive teeth are not developed, the permanent may appear much later than the usual time for their protrusion. Certain diseases of the gum and germ, which subject will be considered hereafter, may destroy the germs of the teeth, and thus cause their absence in certain individuals.*

If the alveolar partitions, during the development of the jaws, be arrested in their formation, and if the dental groove remain free in all its extent, the dental germs are then always grouped and adherent; the teeth which succeed them, are themselves united and form a unique mass, composed of several teeth adhering either at their crowns or roots. Sæmmering, says Marjolin, has seen an example of this disposition of teeth, which, however, must not be confounded with the union of the teeth by a collection of tartar.† Fox has likewise given cases of the mutual adhesion of adjacent teeth by their bodies or roots.

I shall here conclude my remarks on the anomalies of the teeth, which are indeed but very rarely met with in children at the breast.

ART. 3.—Diseases of Dentition.

M. Guersent, in the article on Dentition in the *Dictionnaire de Médecine*, commences with an observation full of truth, and which comes in support of the opinion advanced above. "Most of the diseases of infancy," says this excellent pathologist, "have been attributed to teething. The difficulty of an accurate observation of diseases at this early age, and the little positive knowledge we possess in this department of pathology, have contribu-

* See Appendix.

† Marjolin, *art. Dent. path. du Dict. de Méd. en 21 vol.*

ted greatly to the establishment of this opinion ; and this prejudice, the result of our ignorance, has at last become popular, like all the other prejudices in medicine.”*

As I propose, in this work, to elucidate, as far as I can, the diseases of infancy, I shall not treat here of the sympathetic affections of dentition, such as fever, convulsions, vomiting, diarrhœa, etc. I shall consider these symptoms in treating of the history of the various organs, or the systems of the organs, of young infants, and I shall then endeavor to demonstrate how these diseases become so common at the period of the protrusion of the teeth, and likewise that they are not the cause of this frequency. I shall also make it appear why convulsions of children at the breast, which, since the days of Hippocrates to the present time, have been attributed to the irritation of the teeth, do not depend directly on this irritation, but are really owing to other causes. I shall then consider the local symptoms of dentition.

Dentition being a natural function, may occur without giving rise to the least untoward accident, and, with the exception of an increase of saliva, many children pass this period without any disturbance of their health.

Yet there almost always occurs some itching of the gums, which often become a little red and slightly tumefied. This tumefaction is generally transient, and the accompanying irritation often imaginary, for nurses suppose that it exists because, in placing their fingers in the child's mouth, it bites with evident gratification, thus calming the irritation of the gums. But this conclusion must be false, for how can we conceive that compression of the inflamed gums on the finger can ease the pain ? On the contrary, the distress must be thereby augmented, and the eagerness with which infants bite whatever is put in their mouths, is attributed to the effects of a wish to allay the itching of the gums. Do we not rather see in this the commencement of the proper motion of the jaw, which has just acquired a new degree of development, and is soon to become a part of the digestive apparatus ?

We have seen that from the period of birth to eight months or a year, the teeth grow and raise themselves from the bottom of

* *Dict. de Méd.* en 21 vol. t. 6.

the alveoli to the surface of the gums. During this time, an afflux of blood takes place towards the gums, producing in them and in the jaws a state of congestion and of inflammation; the ulterior progress of which may soften the tissue of the gums, give rise to slight hemorrhages, excoriations, and ulcerations more or less deep, and often end in the destruction of the germs of the teeth.

These affections are observed from the most tender age to the time of the appearance of the first teeth. They must not be confounded with gangrene of the mouth, already considered; but they have a nearer relation to scorbutic affections of adults. I will endeavor, by some examples, to convey an idea of their character.

CASE XV.—*Tumefaction of the gums, effusion of blood in the alveoli.*—Marie Dumé, aged six days, of a tolerably strong constitution, having a good color in the face, but exhibiting a slight jaundiced tint on the trunk and limbs, entered the infirmary on the 13th of October. She cried a little, but remained tranquil, as if drowsy; the mucous membrane of the mouth was in a natural state, but the tongue, at its borders and extremity, was red. (*Gummed rice-water.*) On the fifteenth, the jaundice was less intense, and there appeared a copious diarrhœa; the child became pale, and cried much; the gums of the upper jaw were swelled without being red. (*Same treatment.*) The same state continued until the 20th of October; the diarrhœa then increased; she became pale, but without much emaciation; the upper gum was constantly swelled, and of a livid red. On the twenty-fifth, all the symptoms increased, and the child died in the night.

Post mortem examination.—The upper gum of the right side exhibited a violet-colored tumefaction, with an evident fluctuation. An effusion of black fluid blood was found in the alveoli of the first three teeth. The incisor teeth and the portion of the germ which was not ossified, were loose in the midst of the effused blood which formed the tumor; the osseous crowns of the teeth were soft, red, and somewhat macerated in the fluid. The surrounding soft parts had begun to separate from the alveolar process. The rest of the mouth was healthy.

At the lower extremity of the œsophagus, there were found some traces of muguet, and traversing the surface of the stomach, several

striæ: the mucous membrane at the end of the duodenum was thick and tumefied. In the neighborhood of the ilco-cæcal valve, were six follicular spots, red, and much tumefied; the liver was gorged with blood; the bile was abundant, ropy, and of a pale green. The lungs, heart, and brain were healthy.

This case is remarkable in two respects: it shows us, in the first place, that the affections having their seat in the teeth or their germs, may exist at the earliest periods of life, as at the seventh and ninth month; and in the second place, it enables us to understand how it happens that hemorrhages occur in the dental grooves after this sanguineous congestion, so frequent in these parts in young infants.

The following instance gives us a case of the same affection in a more advanced stage.

CASE. XVI.—*Muguet, sanguineous congestion and destruction of the gums, suffocating cough, gastritis.*—Anna Gens, aged twenty days, entered the infirmary on the 13th of August. She was vigorous, and generally in good condition; the tongue was red on the upper surface, where there appeared several spots of muguet; it was on this account that the nurse ceased to have the care of her. (*Gummed barley-water, emollient gargles, milk and water.*) On the fourteenth, the muguet had extended over the whole mucous membrane of the tongue even to the velum. (*Same treatment.*) On the eighteenth, the child vomited the drinks immediately after they were taken; nothing remarkable occurred until the 1st of September, when the respiration became much accelerated; the skin at night was very hot and dry; the pulse was full, but did not beat with more frequency than ordinary, (ninety pulsations.) The mouth was covered with several patches of muguet. (*Dococt. of marshmallows, a linctus with half drachm of syrup of poppies, strict diet.*) On the eighth, the cough increased, and assumed the characters of whooping cough; the face was œdematous; the gums were red, puffed, and bloody. (*Same treatment.*) On the twelfth, there was a considerable increase of all the symptoms, and a general tumefaction of the gums and jaws. On the fourteenth, the upper gum of the right side was more tumefied than at other points. On the fifteenth, the deglutition was more difficult, and the drinks regurgitated through the nose; the child, by the violence of the cough, was every moment threatened with suffocation. (*Same treatment.*) On the seven-

teenth, the deglutition of liquids was almost impossible, whilst the child easily swallowed pap. On the eighteenth, the swelling of the upper lip had made considerable progress; the face continued œdematous; the muguet no longer appeared, and the buccal membrane, in general, was not very red. On the nineteenth, a violet-colored ecchymosis manifested itself on the ala of the nose; the cough continued frequent, but without suffocation; the skin was very hot, yet the pulse was in the natural state. The child died at night.

The examination of the body was made on the ensuing day. An œdematous swelling, red, and very soft, was observed on the upper right gum; there existed, on this side only, an œdematous tumefaction of the parietes of the mouth; but on the outside, the skin did not exhibit the cupreous and oily aspect which characterizes the precursory œdema of gangrene of the mouth. On opening the tumor of the gums, it was found to consist of grumous and black blood, in the midst of which floated the germs of the teeth, entirely detached, falling out with the blood which flowed from the tumor. There also existed a thick bed of muguet at the base of the tongue. The stomach was contracted and wrinkled, and its mucous coat thick and of an intense red. At the lower part of the ileon, there were some follicular patches, pale, and slightly projecting. The liver was gorged with blood, and the entire venous system of the abdomen was in a very remarkable state of congestion.

The glottis was the seat of a strongly marked œdema; the trachea, bronchiæ, and lungs were healthy; the arterial duct and foramen ovale were both closed.

The coexistence of the affections of the teeth, the congestion of the gums, and the œdematous swelling of the face on the diseased side, ought particularly to be noted. This agreement establishes the existence of some connection between the diseases of the gums and of the teeth, and gangrene of the mouth. I do not doubt that this latter disease may follow the swelling and the disorganization of the gums. If it should occur in a child in whom the second dentition had commenced, the consequences would be very serious, and might result in the loss of the teeth for the remainder of life. I am led to believe that Van Swieten has alluded to this complication of gangrene of the mouth, when he says: *Vidi aliquoties in pauperum infantibus, qui omnino neglecti fuerant partem ossis maxillæ cecidisse una cum alve-*

*olis et dentibus contentis : undē in hoc loco destructæ maxillæ totâ vitâ fuerunt adentuli.**

These effusions in the alveoli become less frequent in proportion as the child advances in age, and as the tooth, in becoming developed, fills the alveolar cavity. The sanguineous exhalation then occurs on the surface of the gums in the buccal cavity, a circumstance which can scarcely be perceived because the child, by sucking, prevents it from flowing to the outside.†

The gums of a young child may become much more superficially inflamed; at the time of the appearance of the first teeth they become partially tumefied, and a slight local inflammation ensues at the place of each tooth. I have seen this affection in a child of eighteen months, in whom all the first teeth had protruded. This inflammation was characterized by a red festooned line following the contour of the gums in the direction corresponding with the neck of the teeth.

It is possible that this inflammation may be so far advanced as to cause a dryness of the mouth, and a general redness of the mucous membrane lining this cavity—in a word, all the characters of erythematic stomatitis accompanied with fever, restlessness, and constant crying; but it must be admitted that this is of rare occurrence. Great attention must be paid to the treatment of this phlegmasia, the propagation of which, by contiguity to other parts of the digestive passages, being very rapid.

The treatment of local affections of first dentition ought to be simple when they are the only ones which occur. Van Swieten is one of the authors who has given, with great plainness, the indications which should be followed in such cases; therefore the method of treatment which I propose to recommend may be considered, in some respects, but kind of translation from this author on the same subject.

It is necessary, says Boerhaave, to soften, sooth, and refresh the gums with emollients, mucilages, and antiphlogistics, and to make use of hard, smooth bodies, or to make incisions in them by means of a lancet.—(Aph. 1377.)

This aphorism contains the sum of all the means advised by

* Comm. in Boerhaave, *aphor. de morbi infant.*

† I have not seen the inflammation of the germs of the teeth; yet Baglini, Moreau de la Sarthe, and M. Oudet have given examples of it.

authors to favor the eruption of the teeth. But the commentator of this illustrious writer, in developing his precepts, apparently opposes or disapproves them.

Thus, he advises the use of emollients and mucilages to calm the irritation, and he recommends, among other preparations, a mixture of cream, the white of egg, and syrup of violets; the mixture may be rendered more liquid by the addition of rose water. It may be applied to the mouth by means of a piece of lint, and without doubt will be found very useful in the treatment of acute inflammation of the gums. The root of marshmallows saturated with syrup may be given to the infant to chew with advantage. If there should occur in the head a sanguineous congestion giving rise to serious apprehensions as to the result, it will be useful, observes Van Swieten, as Harris remarks, to apply a leech behind the angle of each jaw. The extreme irritability of the mouth ought also to be taken into consideration, and no hot drinks or food be given. It may be necessary to remove the child from the breast, or to give the nurse very mild nourishment, together with emollient drinks. She should also be required to abstain, during the period of dentition in her charge from the use of wine and other stimulating drinks.

As to the employment of hard substances between the gums for the purpose of making a passage for the teeth, Van Swieten has not rejected them, and in this he is wrong; and M. Gardien has clearly demonstrated that their use is by no means rational. It has been said that it diverts the pain of the teeth, and that it is seconding the desires of nature, which inspires the child with a constant wish to carry to its mouth every thing given to it. But is the patient who is affected with the itch, and who tears the skin with the violence of scratching to calm the irritation, in obeying the counsel which nature appears to dictate to him for the assuaging of his distress—is he following a rational indication, and is he sooner cured of his disease? Let us guard then against the use of these pretended inspirations of nature a vague term, and better suited for the vulgar than for physicians. If, as is of daily observation, the infant sleeps when the nurse gently rubs the end of her finger over the irritated gum, it is because the pressure is extremely gentle, and the pleasurable sensations thereby produced assuage the pain of the gums. But this is far differ-

ent from the introduction of a coral, crystal, ivory, or amber. Let us reject all these useless means, and leave them in the oblivion to which the good sense of the present day has condemned the necklaces, bracelets, and amulets.

The question upon the necessity of cutting the gums in order to facilitate the eruption of the teeth, a practice which is at this time much followed in England, has been much agitated. Van Swieten again gives upon this occasion a wise precept. It is not necessary, he says, to make an incision in the gums until they are evidently raised by the teeth, are hard, red, and very painful; for if the tooth, too deeply situated, does not soon protrude through the incision, the latter cicatrizes; and the cicatrix, harder than the proper tissue of the gums, afterwards affords a strong resistance. Besides, the physician might endanger his reputation should he chance to cut the gum without the subsequent appearance of the tooth. I saw a case, says Van Swieten, where a tooth did not make its appearance until eight months after the incision had been made to hasten its protrusion. The incision also may become a troublesome ulcer, which, assuming all the characters of apthous or gangrenous ulcers, may thus produce an obstinate and painful affliction of the mouth.

I have not spoken here of the treatment of general affections connected with dentition, as I will consider them in the place proper for the examination of each of these diseases. *

SECTION III.

DISEASES OF THE SALIVARY GLANDS.

The salivary glands are rarely diseased in young infants; they do not grow rapidly, nor exhibit any functional activity, except at the time of the appearance of the first teeth. I have often dissected them at this period to ascertain precisely their condition, but without being able to discover any thing worthy of remark. Yet I have often met with the parotid gland, or the granulations composing it, bathed, as it were, with blood. This condition was connected with a sanguineous congestion of all the surrounding parts.

* See Appendix.

I have seen at the Hospice des Enfants Trouvés, one case of congenital ranula. The child, a female, was brought to the hospital during the night; she was healthy and strong; upon crying, the tongue was raised, and exhibited a transparent tumor on the left of the frœnum, resting on the internal face of the jaw. This tumor was irregularly oblong, and occupied exactly the place of the submaxillary gland; it was very elastic, did not empty itself on pressure, and appeared more full when the child was not crying. M. Baron, who examined this tumor with close attention, did not hesitate to express as his opinion, that it was the result of an accumulation of saliva secreted by the sublingual gland, the orifices of which were without doubt obstructed.

This fact, with others which I shall point out in the course of this work, proves that the secreted fluids of certain glands, how slightly developed soever they may be, even during intra-uterine existence, must have a passage to the outside of the gland.

This child having been taken to the country two days after, it was impossible to ascertain the ulterior progress of this disease.

SECTION IV.

DISEASES OF THE GUTTURAL PORTION OF THE DIGESTIVE TUBE.

I propose in this place to consider the affections of the velum, and pillars of the palate, of the tonsils, and of the pharynx.

Congenital malformations. The malformations of the velum consist more particularly of a division, to a greater or less extent. I have already spoken of this subject, and have also noted the effects which follow from it, and the precautions necessary to be taken during the sucking of the child. I have never observed that its length in any degree hindered deglutition, and that a removal of part of the uvula was necessary in young infants.

Alterations in the form of the pharynx are the only changes which I have noticed; for on examining dead bodies of children, the pharynx has sometimes been found very narrow; we might be led to the belief that this was the result of a state of contraction of the constrictor muscles, but the base of the tongue was also found narrowed, and the cornua of the os hyoides were approximated, so that it was very probable that this narrowness depend-

ed on a malformation. If it exist to a great degree, the effect is a considerable difficulty in swallowing, as we have seen was the case in the infant described in case ix. If therefore a young infant exhibit much difficulty in swallowing the milk which it drinks or sucks, before concluding that this is an evidence of a phlegmasia of the organs of deglutition, it will be necessary to examine with attention the form of the tongue, the narrowness of which is almost an evidence of the narrowness of the pharynx. This examination is not without its utility, because the physician can then confine his treatment to advising that drinks be given with caution, and in small quantities at a time, while in the former case he ought to use all the means in his power for the treatment of the inflammation.

SANGUINEOUS CONGESTION OF THE ORGANS OF DEGLUTITION.

The veil of the palate, and the isthmus of the fauces in young children are almost altogether injected and red. The pharynx is generally in a high state of congestion, and this congestion is the more considerable in proportion to the nearness to birth. I do not know to what cause to attribute this condition. It is a fact to which the attention of physicians ought to be directed, because it may very easily be mistaken for an inflammation of these parts. I have examined the pharynx with great care in a large number of young infants, and obtained from this examination the following data:

In two hundred children, aged from one to ten days, that had died from various diseases, I found the isthmus of the fauces injected in one hundred and ninety. This injection was generally spread in a uniform manner, but sometimes it appeared in the form of ramifications more or less distinct. I did not find any relation worthy of note existing between it and the intestinal canal; but this was not the case with reference to the duration and intensity of the congestion, and the redness of the integuments which exists in young infants during the first eight or ten days of their life. There appeared to me to be an intimate connection between the vascular system of the skin and that of the mouth and isthmus of the fauces, since these parts exhibit at the period of birth a sanguineous congestion, the duration of which

is the same, and for the existence of which there appears to be no pathological cause. The same phenomenon appears in all infants under all circumstances. This remark will bring to mind the analogy of sensibility and irritability that authors have recognised between the cutaneous system and mucous membrane of the throat—an analogy which demonstrates in a very evident manner the development of an anginose affection at the commencement, or during the progress of certain cutaneous phlegmasiæ.

The tonsils, although but little developed in young infants, yet partake of the same state of congestion as the surrounding parts; and I have often found them in dead bodies, saturated as it were with the blood that was effused around them.

INFLAMMATIONS.

The inflammation of that part of the digestive tube which we are now considering, has been designated by the name of guttural, pharyngeal, or tonsillar angina.

MM. Roche and Sanson, in their excellent work,* have described the various localities of this inflammation under the names of palatitis, pharyngitis, and palato-pharyngitis; but as each of these parts is rarely the exclusive seat of the inflammation, which generally spreads successively to all, I shall devote to their history but one chapter, taking care to point out their different localities.

Inflammation of the velum of the palate, or palatitis, is of frequent occurrence in young infants; it may be simply erythematic, or may be accompanied with the altered secretion constituting muguet. In this case it almost always follows stomatitis, which often spreads by the continuity of tissue even to the velum and uvula. The causes are the same as those of inflammation of the mouth. The pellicle which then covers the velum palati must not be confounded with the false membrane of croup, the principal characters of which it appears to possess. It is equally important not to mistake it for a gangrenous eschar, from which

* *Nouveaux élémens de pathologie médico-chirurgicale*, 5 vol. Paris, 1828. [This work is now in the process of translation, by A. Sidney Doane, M. D.—S.]

indeed it essentially differs. The works of Guersent and Bretonneau have put us on our guard against this last mistake.

The tonsils may likewise inflame in children at the breast, but tonsillitis appears to me less frequent at this age than at a more advanced period of life. Inflammation of the tonsils may be simple, and not characterized by any thing but redness and tumefaction; it may be complicated with an altered secretion, a complication which is of very frequent occurrence. It is not impossible for the tonsils to ulcerate and be destroyed by gangrene; but these kinds of inflammations are very rare in infants at the breast, and I am not in possession of any example of such a variety: finally, the pharynx itself may become the seat of all these modifications of inflammation which we have just mentioned.

It will sometimes be difficult to recognise inflammation of these parts in young infants, as the ordinary aspect of the state of congestion has a great resemblance to redness of inflammation; yet we may assist our diagnosis by the following considerations.

The isthmus of the fauces and the pharynx may be considered as inflamed—1st, When the duration of this redness continues beyond the ordinary time of the disappearance of the congestion in young infants, ten or twelve days, for example; 2dly, When, instead of being uniformly spread over every part of the throat, it occupies separate points; 3dly, When some one of the symptoms of cynanche tonsilaris, which we will mention below, exist at the same time as the redness; when, lastly, this redness is met with at a period when it is no longer a natural state of the part.

I will begin the symptomatology of inflammations of the guttural region, by a detailed exposition of some facts, from which I will deduce the history of the symptoms of this disease in young infants.

CASE XVII.—Paul Bedquier, aged ten days, entered the infirmary on the 25th of May, 1826. He had been very restless the preceding night, and had vomited several times; his nurse remarked that he had sucked badly often loosing his hold on the nipple, crying, and vomiting the milk he had taken. The deglutition was often so difficult as to produce a convulsive movement in the superior extre-

mities. His cry was natural and strong; there was no fever present. (*Sweetened decoction of the Tilia, with half a drachm of syrup of poppies to two ounces of the infusion; milk and water for nourishment.*) The next day, M. Baron saw, on examining the mouth, that the base of the tongue, the velum, and fauces, were very red; and he was of the opinion that the disease was an inflammation of the pharynx. The child, however, became more calm and ceased to vomit. The nurse having charge of this child administered the drinks with caution, for she had observed that the child drank awkwardly. This patient remained some time in the infirmary without presenting any remarkable symptom; on the 25th of May he had a slight puriform ophthalmia which lasted but a few days. On the 6th of January, a few points of muguet appeared on the borders of the tongue, which quickly disappeared. It was observed that deglutition was always difficult, and that it was necessary to give the drinks with caution. The pulse was natural, and the temperature of the skin as usual. (*Sweetened barley-water, emollient gargles, milk and water.*)

On the 14th of June, it was observed that the child had become emaciated and pale, and the face a little infiltrated. For some days he had been affected with a copious diarrhœa, consisting of yellow liquid discharges. This state continued until the 20th of July, when he died.

The post mortem examination was made the next day, when there was found a very intense redness, and evident tumefaction of the internal membrane of the pharynx. The surrounding cellular tissue was infiltrated with a considerable quantity of citron-colored serum; the œsophagus and stomach were healthy. At the termination of the ileon there existed several follicles, slightly injected, and the termination of the colon was of a slate color. The liver was of a deep brown, and filled with a black liquid blood. The lungs were much injected, with some red striæ at the internal surface of the bronchiæ and of the trachea. The nasal fossæ were very red, and filled with recently effused blood. The brain exhibited nothing remarkable.

This child, without doubt, died from a chronic colitis; but in addition to this, he was affected with inflammation of the pharynx, the symptoms of which were very evident during life. We ought also to notice that the cry of the child was not altered, and the act of deglutition alone was performed with pain. Febrile

symptoms, which always attend anginose inflammations in adults, were absent in this case, and must be attributed to the age of the patient.

On the preceding instance, the velum and pharynx were the seat of the inflammation; we shall see in the following case, that the phlegmasia was confined solely to the walls of the pharynx.

CASE XVIII.—Molard, a boy aged seventeen days, entered the infirmary on the 26th of January, for muguet of the mouth, without any serious symptom. (*Gummed barley-water, gum-syrup, emollient gargle, milk and water.*) On the 1st of February, the muguet had disappeared, but the child cried frequently, slept but little, and became emaciated without having any diarrhœa. He vomited almost as soon as he had taken his milk or his ptisan; there was nothing remarkable in the deglutition; the abdomen was neither painful nor swelled. On the 5th of February, the vomiting returned with greater frequency, almost immediately following deglutition. The velum was healthy, and the tongue a little red; the infant became pale, and the lower extremities were hard and œdematous. (*Sweetened rice-water, milk and water.*) On the following day, the abdomen became swelled, a copious diarrhœa succeeded, and death took place on the 12th of February.

Post mortem examination.—The tongue was very red; the velum healthy, but the mucous membrane of the pharynx of an intense red, and covered with a considerable quantity of frothy mucus, strongly adherent. This redness disappeared at the commencement of the œsophagus, the membrane of which was of a delicate rose color. The stomach was perfectly healthy, and contained a quantity of ropy mucus. The ileo-cæcal region of the small intestines exhibited a uniform redness, in the midst of which was a sanguinolent exudation. The large intestines were healthy; the lungs crepitated well; the heart contained but little blood; the ductus arteriosus was obliterated, but the foramen ovale was still open. The occipital sinus was gorged with blood; the cerebral pulp was of a rose color; there was but little serum in the ventricles.

This case is but of secondary interest; for, in spite of the inflammation of the pharynx, there was scarcely any thing besides the vomiting immediately after deglutition, which gave any indication of the seat and nature of the disease. I have given it a

place here because the least important facts in a science of observation are of consequence.

We have thus far recorded nothing but cases of erythematic inflammation of the pharynx; we shall now give an example of phlegmasia of the velum, tonsils, and pharynx, with altered secretion.

CASE XIX.—Augustine Blondel, aged twelve days, entered the infirmary on the 13th of July. This child was very vigorous. She refused the breast, cried incessantly, and slept none. The cry was husky and laborious, respiration difficult, face purple, and neck a little tumefied. On examining the mouth, the velum alone was found a little red. There neither existed any sensible acceleration of the pulse nor heat of skin. (*Gummed barley-water, emollient gargle, two leeches to each side of the neck, strict diet.*) On the fourteenth, several spots of muguet appeared on the tongue, and all the buccal membrane was of an intense red; there were also several patches of muguet on the velum, the redness of which was much increased. The tonsils, which were red and very much tumefied, were covered with a slight membranous exudation. There existed no fever; the heat of the skin was natural; the face continued purple; the cry was painful, but the respiration less difficult. Deglutition was almost impossible. (*Cataplasm to the neck, blister to the legs, barley-water for drink and for a gargle.*) On the fifteenth, there was no fever, pulse ninety, cry smothered, respiration difficult; the child was more affected with regurgitations than with vomiting. On the eighteenth, the muguet, less abundant in the mouth, formed upon the pillars of the palate and on the tonsils an accumulation so thick that there existed only a very narrow passage. The cry was less smothered; both parts of it were heard, but the reprise was acute and tremulous, and sometimes interrupted, in some respects analogous to the crowing of a cock. The face was less purple. On the nineteenth, the cry was less husky, and approached more to the natural state; respiration was more full; the face was pale and expressive of pain. (*Continued the blisters and emollient drinks.*) On the twentieth, the tonsils were freed from the coating of muguet; they were still red, but their tumefaction was less. Deglutition was difficult, and it was necessary to give the drinks by drops. When the fauces were examined, several spots of muguet were to be seen in the pharynx. From the twentieth to the twenty-fifth, the health of the child rapidly increased, and deglutition became more easy.

Milk and water was given for nourishment. On the thirtieth, the cure was complete, although the tonsils were still very red. Deglutition was easily performed; the circulation soon arrived at its healthy state, and the face regained its color. The infant was placed in charge of the ordinary nurse on the 3d of August, and left the hospital for the country on the eleventh of the same month, completely restored to health.

This inflammation of the tonsils and pharynx was, without doubt, complicated with laryngitis, if we may judge from the alteration of the cry and the difficulty of respiration. But independently of this complication, we must not lose sight of other symptoms, such as regurgitation, tumefaction of the neck, and the refusal of the breast, because the infant could not swallow without pain. We should also consider the success of the antiphlogistic treatment adopted by M. Baron, unusual in an hospital, and at an age when so many morbid causes counteracted the efforts of the physician; the case is not the less interesting with reference to the alteration in the cry, caused, no doubt, by the formation and the extension of the pellicle of muguet on the tonsils, and probably on the glottis.

It will be useless to multiply examples of inflammation of the velum, tonsils, and pharynx. I shall, therefore, give a synopsis of the symptoms of this disease.

When the inflammation of these organs is slight, their functions are but little disturbed. But when, on the contrary, there is some degree of intensity, deglutition is difficult, and when accomplished, it is quickly followed by regurgitations or vomiting, even when the œsophagus and stomach are healthy, as we have seen in eighteenth and nineteenth cases. Therefore, if we see a child refuse the breast, swallow with difficulty what is given it to drink, or when the face expresses pain on swallowing, it should then be the duty of the physician to examine the fauces, to ascertain whether it is not the seat of an erythematic inflammation with altered secretion. If the neck is tender and painful to the touch; if the child cries out when this part is examined; if, after these symptoms, there succeeds a tumefaction of the tonsils, an alteration of the cry and of the physiognomy, we ought then to be satisfied of the existence of *cynanche tonsilaris*, or inflam-

mation of the pharynx. I have never been sensible of the odor which is observed in adults in similar cases.

Treatment.—In the first place, the child ought not to be allowed to suck, because it generally sucks with such avidity as to have a large quantity of milk carried to the throat at one time. It is much better to feed the child either with a spoon or a sponge; to wash the mouth with a pledget of lint soaked in a decoction of marshmallows. The neck should be enveloped in a cataplasm, and one or two leeches applied on the sides of the pharynx, if the inflammation be very intense, using, at the same time, revulsives to the legs or feet, either by means of a hot cataplasm almost burning, or with a mustard poultice, or a stimulating bath. If these means are insufficient, recourse must then be had to blisters. If there exist no symptoms of gastro-enteritis, injections should be administered, composed of a decoction of prunes, or a mixture of equal parts of milk and burned sugar, or one or two grains of calomel in two spoonsful of sweetened water. But these derivations ought to be used with the greatest caution, for it is very rare, as we shall hereafter prove, that one part of the digestive tube alone is inflamed in young infants. If, after the employment of antiphlogistic means, the child continues tormented by pain and wakefulness, opiates must be resorted to, especially the syrup of poppies, taken in the dose of half a drachm in an ounce of sweetened water in the space of two hours.

I think it altogether useless to produce vomiting in infants affected with tonsillitis, for there already exists a great tendency to vomiting, which appears rather to augment than to diminish the disease. An antiphlogistic treatment, such as is reported in the case of Augustine Blondel, answers a much better purpose.

SECTION V.

DISEASES OF THE ŒSOPHAGUS.

Congenital malformations.—The malformations of the Œsophagus which are developed during intra-uterine life, and which give rise to serious consequences, are not very numerous. They generally exist, as Meckel says, at the same time with the ab-

sence or default of conformation of one part or several parts of the face or mouth ; or, as in the instance related by M. Lallemand of Montpellier, with what appears to have been the destruction or deviation of the parts which surround and sustain the œsophagus in its natural position.

These primitive malformations consist in the absence of the œsophagus ; in the obliteration of this membranous passage, terminating in a cul-de-sac ; or in a division of a part of the œsophagus in two passages placed the one beside the other.

The following is a remarkable instance of absence of the œsophagus.

The subject of this case was born at the full time, destitute of the œsophagus. It lived eight days, and was observed by Dr. Sonderland at Barmen.

On the 2d of August Madame B—— was delivered of a child at the full time, and who appeared in good health and well formed. After the accouchment, there was a large discharge of water, and the placenta was two or three times the ordinary size. A small quantity of sweetened water was given to the child, which it swallowed greedily, but the fluid returned immediately through the nose and mouth, almost producing suffocation. Endeavors were repeatedly used to make it swallow some kind of drink, but without avail, the same effect constantly followed every attempt, whence it was natural to infer that some kind of malformation existed in the œsophagus. This child lived eight days, at the end of which period it died of hunger. During its life the urine and fœces passed as they usually do, except in smaller quantities. On opening the body, the most remarkable thing that appeared was the extraordinary size of the liver, covering all the viscera of the abdomen to the umbilicus, but in other respects quite natural. The gall-bladder was filled with bile. Upon raising the liver, the stomach and intestines were found of the usual conformation, and their situation was the same as usual, but the cardiac orifice was wanting, and in this place the stomach adhered to the diaphragm by cellular tissue. The right lung was distended, and was of a rose color ; the left, on the contrary, was dense in structure, and of a deeper hue, proving that the child had only respired with the former. The heart was well formed, except that the septum of the auricles was open. The œsophagus was

wanting the whole of its length, and the pharynx terminated in a cul-de-sac.*

The most remarkable case of the termination of the œsophagus in a cul-de-sac, and without any communication with the stomach, is that recorded in the inaugural dissertation of M. Lallemand, of an anencephalic fœtus born at the Hotel Dieu in 1816.

"In examining the traces of the brain," says M. Lallemand, "we found behind the neck, below the sphenoid bone, a white, resisting spherical body, which was regarded as the cerebellum, and which was covered with a fold of the dura-mater, which forms the tentorium. But, after having cut into the exterior membrane, we were much surprised to see a green substance of some consistence, resembling the meconium in every respect, issue from a sort of sac-like cavity; the resemblance was so perfect that it was the first comparison that occurred to the minds of those who were present."

"The internal surface of this sac had all the appearance of a mucous membrane; it was in truth that of the pharynx and œsophagus. This was ascertained by passing a probe from the bottom of this cavity across the vertebral column out at the mouth. The œsophagus had protruded in crossing an opening, and thus forming a fold, like a portion of intestine in hernia. The cavity was considerably dilated by the accumulation of meconium. Just before entering the thorax, the œsophagus was shrunk, and even obliterated to such a degree that I could not pass the finest probe into the stomach, while a very large one could be passed by the mouth without difficulty."†

This malformation, remarkable as it is in several respects, does not assist our diagnosis of a similar affection; for the child thus affected was not viable, and consequently did not present any sign by which the nature of the disorder could be ascertained; but from the preceding case we are able to point out what would be the signs of obliteration of the œsophagus of a new-born child.

Deglutition, in the first place, would be altogether impossible; the child quickly vomits its milk, and when the cul-de-sac result-

* *Journal complément. du Dict. des sciences méd.* t. 8, p. 369.

† *Observations pathol. propres à éclairer quelques points de physiologie.* Paris, 1818.

ing from the obliteration is filled, a soft tumefaction which augments at each attempt at deglutition is very evident; and after this sac is emptied, nausea continues; the child making the same useless attempts at vomiting as is observed in dogs when they have been poisoned, and when the œsophagus has been tied in order to prevent the vomiting of the poisonous substance.

What treatment should be adopted in such cases? It is without doubt extremely difficult to remedy this deficiency, and a hope can scarcely be indulged of saving a child thus condemned to almost certain death; yet as it may sometimes be of great importance that the child should live for a few hours or days on account of the succession in families depending on the establishment and duration of life, the physician ought to use all the means in his power for its prolongation to as long time as possible. He will therefore endeavor to sustain the child by injections of milk, or a mixture of equal parts of milk, and thick broth. In addition to these means, attempts ought to be made to ascertain whether the œsophagus be altogether closed, and whether a gum elastic catheter could not be introduced into the stomach, by which some liquid nourishment might be conveyed into the digestive passages. This catheter might also seem to dilate gradually the œsophageal canal.

Although advising these means, yet I very much doubt their efficacy, and the cure of so great a derangement can hardly be expected, except in the case of the obliteration being but partial, otherwise it must be almost a miracle.

Alterations of texture developed during intra-uterine life.—In order to appreciate properly these alterations, it is necessary to have an exact idea of the œsophagus in a young infant. I examined this membranous canal with much care in almost all the children that died during the year 1826 at the Hospice des Enfants Trouvés. In about two hundred, where there was reason to believe that this organ was healthy, I found it more or less injected in one hundred and ninety—that is to say, in the same children of whom I have already spoken as having exhibited the injection of the pharynx, this injection presented different aspects, but it rarely had a ramiform appearance. It was more generally of a uniform color, varying from a bright red to a violet, and always terminated abruptly at the place where the epithelium

entirely ceases. My remarks with reference to the habitual redness of the pharynx are applicable to the œsophagus; both appear to me to be natural in new-born children, and this congestion is doubtless owing to the same cause as that of the general injection of the external integuments, and ought not to be considered as a pathological condition, since it is to be observed in all young infants. M. Baron, who has for a long time noticed this habitual redness of the œsophagus of young infants, has never regarded it as pathological; and I think that it is the effect of the passive congestion resulting from the imperfect establishment of respiration and circulation.

But if besides the injection and redness which we have pointed out as existing in the œsophagus, we find an alteration of a more serious nature in the internal membrane of this canal in a young infant, such alteration must be regarded as the result of some slight morbid cause. Let us endeavor to demonstrate the truth of what has been advanced by some examples.

CASE XX.—Deher entered the Hospice des Enfants Trouvés on the 20th of March. In this child, who was a male, the umbilical cord was soft and fresh, and had been recently tied. The clothes were already stained by the meconium, and there had been vomiting of glairy matters; the face was red and pinched, and the extremities cold, yet he appeared to possess a good constitution. He died on the night of the 26th. The post mortem examination was made twenty hours after death. The mouth and pharynx were found much injected. Besides this, there existed in the whole length of the œsophagus a considerable number of mucous follicles very much developed, and which for the most part were surrounded at their base by a red circle, more vivid than the general red and violet color presented by the parietes of the pharynx and œsophagus. Some of these follicles had begun to ulcerate at their summits, exhibiting a superficial yellow laceration. The same alteration was met with in the same degree in the stomach, which contained brown matters of the consistence of mucus. They adhered closely to the sides of this organ. The small intestines presented a strongly marked venous congestion. The two lungs were much congested with blood. The obliteration of the foramen ovale and the ductus arteriosus had already commenced; there existed also a slight congestion of the brain.

This child died from congestion of the lungs, but besides this cause there evidently existed another affection, that of the follicular apparatus of the œsophagus and stomach, developed probably during intra-uterine life; for it had not had sufficient time to make so great a progress in the single day that the child had lived. The following case exhibits a much greater alteration in the œsophagus.

CASE XXI.—Bouton, a boy recently born, entered the hospital on the 4th of April, and died on the night of the 5th, but I did not observe the symptoms which he presented. It was simply reported to me that he had vomited several times the evening before, and that he did not appear disposed to suck, nor did he long retain his milk. I opened the body six hours after death, and found the mouth injected, the pharynx very red, and the internal membrane a little tumefied. In the upper part of the œsophagus there were two ulcerations, almost parallel, of an oblong shape, each being about four lines in length; their bases were yellow; their borders, which were perpendicular, presented, with the upper third of the œsophagus, the bright color of carmine; the stomach and the entire intestinal tube were the seat of a very manifest sanguineous congestion, with a sanguinolent exudation in the whole extent of the digestive canal. The liver was easily reduced to a soft mass; the gall-bladder, much dilated, contained black and tarry bile.

The lungs were engorged, and a considerable quantity of sanguineous serum was effused in the thorax. The fœtal openings were still free, the brain was found very much injected, and there was an effusion of blood between the tunica arachnoidea and the pia mater. The two cerebral ventricles contained bloody serosity.

Besides the general sanguineous congestion which in this child prevented the development and exercise of the functions of the principal organs, it is evident that he was affected, when born, with inflammation and ulceration of the œsophagus, an affection of a very serious nature, and which would to a great degree impede the action of deglutition, and thus materially interfere with digestion and nutrition, two of the most important functions of life.

If the facts just cited do not throw much light on the symptomatology of œsophagitis, they still prove to us that it is possible for infants to be born with inflammation of the œsophagus, which

may be to them the source of very serious consequences, to the relief of which the physician ought to apply the appropriate remedies from the first moments of life. We shall next consider the history of œsophagitis developed after birth; and our remarks on the diagnosis and treatment of this disease, will likewise have reference to congenital œsophagitis.

DISEASES OF THE ŒSOPHAGUS DEVELOPED AFTER BIRTH.

When treating of diseases of the mouth and pharynx, the progress of the alteration in those diseases being submitted to actual inspection, the march of the symptoms accompanying them were clearly seen and described; but such an inspection cannot be exercised as we advance to the lower portions of the digestive tube; we are, therefore, obliged to take another course, different from the one hitherto taken, and to trace the diagnosis, and suggest the treatment of the diseases about to be considered in proportion as the facts are unveiled to us; for this is not a work of imagination—a record of abstract and preconceived ideas—but it is our wish to be a close and faithful interpreter of nature, and to speak only from the facts before us. Let us begin then with the history, a dry one it is true, but not the less indispensable, of the facts which we have collected in relation to the diseases of the œsophagus of new-born children.

Inflammations.—Œsophagitis is rare in adults; its common cause is the swallowing of irritating poisons. Thus œsophagitis is almost always produced by poisoning with sulphuric acid. But this disease is less rare in young infants; the reason of which is, that this organ is almost always the seat of congestion to a greater or less extent. On this account it is more disposed to inflammation and disorganization. When inflammation exhibits no other sign than redness, it will be extremely difficult to distinguish it from the habitual congestion of the œsophagus. But when with this redness there are also present some lesion or some of the products of phlegmasia, no doubt ought to exist that the membrane of the œsophagus is then inflamed. Thus, the symptoms which during life accompany the development of these lesions, ought to be considered as proper to œsophagitis, and serve to settle the diagnosis of this disease.

CASE XXII.—Henriette Felicit, aged six weeks, pale and much reduced, had already been twice in the infirmary since her birth, for a diarrhœa of very liquid discharges, accompanied with tension of the abdomen, together with vomiting immediately after having taken drink. She entered the infirmary, for the third time, on the 11th of July, with the following symptoms: general paleness, slight tension of the abdomen, which yet possessed some flexibility; cry, feeble but perfect, with vomiting of the drinks. (*Gumed rice-water, cataplasm to the abdomen, milk and water.*) On the 15th, the face became livid, the child refused drinks, or drank but little; afterwards cried when an attempt was made to put the spoon in the mouth to compel her to swallow. The milk was vomited, almost as soon as it was given her to drink, and without any effort; the diarrhœa continued. From the 15th to the 17th, these symptoms continued, the paleness increased, and she soon fell into a state of marasmus. On the 18th, the face became pinched, forehead wrinkled, cry very feeble, skin cold, and the pulse scarcely perceptible. She died during the night. On making a post mortem examination on the next day, the mouth was found pale, the pharynx injected, the œsophagus of a vivid red at the upper third, on a level with which, the epithelium was entirely destroyed. The remainder of this canal presented nothing more than a number of red striæ.

The mucous membrane of the stomach was of an ash color, and the mucus which covered it, thick and very adherent; at the termination of the ileon there were found eight slate-colored tumefied follicular patches. The left lung was healthy, the right engorged; the fetal openings were partially obliterated; the brain was perfectly healthy.

This child succumbed to œsophagitis, and chronic gastro-enteritis, the probable cause of the diarrhœa, and for which she had been so frequently sent to the infirmary.

The destruction of the epithelium, and the redness of the upper third of the œsophagus, should be noted, and, above all, the quickness, frequency, and obstinacy of the vomiting, and undigested state of the substances vomited. The child rejected the milk almost as soon as it was taken, and in the same condition as when taken; this is a circumstance worthy of remark.

CASE XXIII.—Sophie Taillau, a small child, aged five days,

affected with œdema of the lower extremities, and a rigidity of their articulations, entered the infirmary on the 19th of May. Her cry was laborious and painful; the forehead much wrinkled; there was no diarrhœa, but she vomited promptly every thing she took; the sweetened water given her was rejected, sometimes accompanied with albuminous flakes, and sometimes mixed with yellow matters. The skin was cold, the pulsations of the heart irregular and obscure. This child, nourished only by a small quantity of sweetened water, and milk and water, remained for three days in the same condition, vomiting every thing that was given, together with a large quantity of yellow and inodorous matters. She died on the twenty-second.

Upon a post mortem examination of the body, the tongue was found covered with a coat of mucus, strongly adherent; the pharynx very much injected; the glottis infiltrated and red; all along the œsophagus the epithelium was raised in large shreds, and mixed with a yellow matter, resembling that which the child had vomited. The œsophageal mucous membrane presented, at the parts where the epithelium was destroyed, a very high carmine color. Besides this, there were seen, near the termination of the epithelium, several black striæ.

The stomach presented a large number of follicular ulcerations at its great curvature. The duodenum exhibited a number of red points, and the termination of the ileon was of a uniform bright red. The large intestines were healthy, and the liver was gorged with blood.

The posterior border of the two lungs was gorged with blood; the ductus arteriosus was still open. The brain was perfectly healthy.

Here we have seen, besides œsophagitis, gastritis characterized by a number of ulcerations, the nature of which will be considered hereafter. Perhaps it is to this complication that the vomitings of the yellow matters which attended or followed the vomiting of drinks, are to be attributed. The destruction of the epithelium and the carmine hue of the œsophagus should also be particularly noticed.

CASE XXIV.—*Induration of the cellular tissue, ulcer of the œsophagus.*—Marie Bertel, aged six days, entered the infirmary on the 2d of May. She possessed a strong constitution; the integuments were vermilion; limbs œdematous and hard; the cry suffocating; face without much expression, indicating occasionally, however, the presence of pain. On the third, a great redness appeared

about the arms, together with an abundant diarrhœa of a green color; almost constant vomiting of glairy matter, and frequent regurgitations after drinking. The chest resounded obscurely on the right side; the pulsations of the heart were very obscure and scarcely evident, even with the assistance of the stethoscope; the skin was cold. The child rested in the cradle as if without life. (*Gummed rice-water, sweetened decoction of tilia, dry and warm frictions to the limbs.*) In this condition the child remained until the fourth, but it was observed that she vomited a green liquid in great abundance. Finally, she died at night, after having had, for three days, an existence possessing more the resemblance of a slow dissolution than of life.

Post mortem examination.—Limbs stout; integuments still much colored. The digestive apparatus presented the following appearances: a slight congestion at the base of the tongue; a bright redness of the pharynx; a well-marked injection of the upper part of the œsophagus, with a longitudinal ulceration at its inferior extremity, six lines long and four broad, the bottom of which was yellow, the borders thick and red, as if bloody; the mucous membrane was destroyed in the centre of this solution of continuity, the bottom of which was formed by the cellular membrane; the stomach exhibited nothing but a slight injection; the small intestines were healthy at the upper two-thirds; near the ileo-cæcal region there existed several follicular laminæ, some of which were slightly excoriated; some separate follicles were seen near them; the ileo-cæcal valve was red and slightly tumefied. The internal membrane of the large intestines was very red, considerably wrinkled, tumefied, and very friable. This membrane was covered with a green mucus, closely adherent.

The respiratory apparatus was the seat of several important lesions; the glottis was of a bright red, and much tumefied; the ventricles of the larynx were filled with thick mucus; the trachea and bronchiæ were covered with red striæ. The greater part of the right lung was hepatized.

The heart, large vessels, and the brain, were filled with blood.

Among all the lesions with which this child was affected, we should note particularly the remarkable ulceration of the œsophagus, and the obstinate vomiting, although there existed no gastritis; for we can hardly consider as inflammation of the stomach the slight injection of that organ. The suffocated cry ought also

to be noted, occurring as coincident with an active inflammation of the glottis, which was, as it were, obstructed. The absence of all febrile reaction, notwithstanding the multiplied inflammation of all the organs at once, ought particularly to be remarked.

We have thus far seen œsophagitis without alteration of the secretions. The following cases will furnish us with instances of œsophagitis complicated with muguet.

CASE XXV.—*Muguet of the œsophagus*.—André Tallois, aged one month, was affected for fifteen days after birth with a palpebral ophthalmia, and distinct muguet, confined in appearance to the buccal membrane. On the 19th of January, the nurse having charge of this child, brought him to the infirmary, and mentioned that he had vomited his drinks very frequently, and was daily becoming emaciated. He was indeed pale and thin; the inferior extremities were infiltrated; the cry was very feeble, and the pulse slow and small, and beat from sixty to sixty-five. (*Sweetened gum-water, removal from the breast, milk and water.*) On the 20th of January, the infiltration of the limbs was partially dissipated; the child cried a little; did not appear to suffer much, but vomited almost every thing that was given to drink. (*Same treatment.*) On the 25th of January, the same general state; continuation of vomiting. This state continued without change until the 2d of February, when diarrhœa was added to the foregoing symptoms. (*Gummed rice-water, milk and water.*) From the 5th to the 10th of February, the marasmus made great progress; the cheeks became hollow; the forehead was furrowed with wrinkles; the cry, by its smallness, indicated the extreme feebleness of the patient, and the heart beat with so little force that a kind of trembling was heard, upon auscultation, instead of the true pulsations. Upon raising the child, or changing his place in the cradle, the least movement would cause a regurgitation of milky fluid, sometimes mixed with white, pasty, grumous matter. Death terminated this extreme languor on the night of the 10th of February.

The body was examined on the following day; there was found a general discoloration of the whole exterior, and a complete marasmus; every part of the body appeared, as it were, exsanguined; the base of the tongue was covered with thick mucus; the mucous membrane of the mouth was very pale; the œsophagus exhibited here and there irregular patches of a bright red, and in certain points

a complete destruction of the epithelium. There was besides it, almost the entire extent of this membranous canal, a considerable number of points of muguet, the whiteness of which appeared in strong contrast with the intense redness of the œsophagus. This muguet ceased at the epithelium.

The stomach was perfectly healthy; the small intestines, distended with gas, exhibited at the end of the ileon some red patches, and the mucous membrane had already begun to soften; the membrane of the large intestines was red, wrinkled, and tumefied; the lungs crepitated in the greatest part of their extent; the right lung alone was hepatized at a very circumscribed point; the fœtal openings were obliterated; the brain was perfectly healthy.

I selected this case because the chronic inflammation was the predominating disease, and because the symptoms which this child presented during life had been observed with particular attention.

Now, on the one hand, the obstinate vomiting, rapid decay, and progress of the marasmus, which increased until death, must be noted; and on the other, the healthy condition of the stomach, and the violent inflammation of the œsophagus covered with muguet. So that we are naturally led to establish between the obstinacy and frequency of vomiting, and the disorganization of the œsophagus, a relation so intimate, that we cannot regard the one in any other light than as the effect of the other. But we must not generalize, but still pursue the examination of particular facts.

CASE XXVI.—*Muguet of the œsophagus*.—Alexandrine Rebet, aged fourteen days, entered the infirmary on the 25th of June. She was of a feeble constitution; had neither vomiting nor diarrhœa; the buccal membrane was very red; there existed some points of muguet on the edges of the tongue; the whole surface of the body was slightly jaundiced. (*Gummed barley-water, emollient gargle, abstinence from the breast, milk and water.*) On the twenty-sixth, a diarrhœa supervened, consisting of yellow fluid. The child also vomited yellow matters. The face was much altered, and it became at times the seat of contractions, which appeared to indicate transient pain. The parts surrounding the arms were very red; the limbs were cold; the pulse extremely small and frequent; the cry

was feeble, without being husky or suffocating. (*Same treatment.*) On the twenty-eighth, the mucous membrane of the mouth was of a more intense red; the muguet extended by patches; the diarrhœa continued; the discharges by vomiting very abundant; the matters discharged were less yellow; the jaundice had disappeared; the child began to be emaciated. On the twenty-ninth and thirtieth, the same state continued. On the 2d of July, the diarrhœa stopped, but the vomiting increased; the child retained nothing that was given to her, and she died in the afternoon.

The post mortem examination was made on the next day; the body was partially reduced to a state of marasmus; the tongue and arch of the palate were covered with a very thick coating of muguet; beneath which the epithelium remained healthy; for upon raising the muguet, the epithelium was found adherent to the mucous membrane. The stomach and small intestines were found perfectly healthy; the internal membrane of the large intestines was soft and tumefied, but without redness; the respiratory and circulatory systems exhibited no alteration; the brain was healthy.

In the last two cases, we have seen œsophagitis, accompanied by an altered secretion, following stomatitis with muguet; we have also seen obstinate vomiting while the stomach was healthy. This symptom particularly deserves our attention. Before, however, endeavoring to ascertain its value, let us continue our examination of the lesions of the œsophagus, and the symptoms of these lesions.

The prolonged inflammation of an organ sometimes produces gangrene; that of the œsophagus is rare; yet it is sometimes met with in young infants, as will be seen by the following case.

CASE XXVII.—*Gangrene of the œsophagus.*—Joséphine Charville, aged sixteen months, was affected with a curvature of the spine from an affection of the middle portion of the dorsal region of the vertebral column. She was pale and thin, but did not, by her cries nor by any expression of the face, give any evidence of pain in any part of her body. She had been weaned for some months; and was shortly afterwards affected with a mild attack of measles, which was followed by an eruption upon the lips, consisting at first of small transparent vesicles, afterwards replaced by excoriations covered with yellow scabs. (*Herpes labialis.*) It was for this affection that

she entered the infirmary on the 6th of April, presenting the following symptoms.

Frequent vomiting, particularly after having eaten; acid eructations; pulse slow and small; general paleness. On the 10th of April, the scabs on the lips dried and fell, and no new ones were afterwards formed. Great aversion to food, in a continual state of faintness, without complaints, crying, or restlessness. The servants spoke of the continual tranquillity of this child. Alvine evacuations natural; skin hot; pulse slow, (ninety pulsations.) On the twelfth of April, the face became infiltrated; the limbs underwent a rapid shrinking; the child vomited less frequently the small quantity of milk and water given her, and which was the only treatment prescribed. On the 13th of April, there was an abundant diarrhœa, with tension of the abdomen; infiltration of the face; general sinking; eructations without vomiting; the pulse was always small and frequent, (ninety pulsations;) the marasmus made great progress, the child remaining still silent and prostrated; she cried but little, and did not appear to suffer. On the 15th of April, the same state; last stage of marasmus; extreme paleness; diarrhœa; some vomiting of mucus, mixed with white flakes. On the seventeenth, there was nothing remarkable but the progress of the emaciation. The discharges from the bowels were liquid and yellow, and the abdomen continued tumefied. Hitherto the child had taken nothing but rice-water and a little milk and water. From the seventeenth to the twentieth, she remained depressed, continually becoming daily more emaciated. She died on the night of the twentieth, without having presented any symptoms more violent than those just described.

The post mortem examination was made on the following day. The exterior of the body exhibited a general discoloration and complete marasmus. The mouth was healthy, but at the posterior surface of the pillars of the velum, and on the sides of the glottis, there appeared some small, soft, gray patches, surrounded by a red circle. The same appeared in the whole length of the œsophagus, the mucous membrane of which was reduced to large irregular eschars of the color of soot, leaving between them intervals of deep, bright red excoriations, which crossed almost the whole thickness of the œsophageal canal. The epithelium, destroyed in almost all the length of the œsophagus, did not consist, in the few points that were left, of any thing more than small irregular shreds rolled together. The œsophagus diffused a very evident gangrenous odor. A few red striæ were found in the stomach; there existed a general discoloration of the

mucous membrane of the small intestines; but that of the large intestines was thick, red, friable, and covered with a very abundant mucus.

The lungs were perfectly healthy; the fœtal openings were obliterated; the cerebral pulp was healthy, but the lateral ventricles contained a little more serosity than ordinary.

It was very difficult to make a diagnosis of œsophagitis proceeding to the extent of this case, from the small number of symptoms and the very obscure condition of this child during life: so that we were much surprised to find, upon opening the body, so great a disorganization of the œsophageal canal. Yet the vomitings, however rare they had been, and the frequent eructations ought to be considered as a possible evidence of œsophagitis. The little pain experienced by this child, the absence of all febrile reaction, although at a considerably advanced age, appeared to show that the disease was seated in an organ mortally affected from the commencement of the inflammation.

The principal alterations of œsophagitis having passed in review, we will add to what has been stated, that the epithelium is often found raised in some points like an exfoliation, without any trace of inflammation accompanying it; that the denuded points of the mucous membrane of the œsophagus have a yellow tint in those points destitute of the epithelium, and that nothing is more common than to see the whole interior of this canal covered and colored with matters which have flowed from the stomach towards the mouth either before or after death. Care should be taken not to mistake these various alterations of color for traces of inflammation, and to the existence of which much importance must not be attached. I once found a gelatinous softening at the inferior extremity of the œsophagus, at its lower third, which appeared to be on the point of being perforated. I will refer to this case when treating of intestinal hemorrhages, a disease with which the child was at the same time affected.

If the symptoms which have been observed in children affected with œsophagitis be now recapitulated, we shall see the most frequent is vomiting; that this vomiting exists without gastritis; that its proper characteristic is, that it occurs immediately after

deglutition, or a short time after the ingestion of drinks or aliments. The matters vomited are scarcely altered, and still exhibit the characters of the drinks taken by the child. As to the other symptoms, such as the refusal of the breast, aversion to drinks, deglutition of half solid aliments, with greater ease than those that are altogether liquid, progressive feebleness, and marasmus—they are common to all other diseases of the digestive tube, and only merit a secondary consideration.

I shall now be able to trace the history of this disease in newborn children, as it has been made clear by this statement of facts.

Causes.—The habitual congestion of the œsophagus of young infants is properly one of the predisposing causes of œsophagitis, which in them is really of much more frequent occurrence than in adults. If authors on the diseases of children have not pointed out this frequency, it is, without doubt, because they have neglected to enlighten themselves on this subject, by the examination of the bodies after death, and particularly the pharynx and œsophagus. The occasional causes depend on the nature and temperature of the drinks which are given to children. If, when they are fed with the spoon, wine, broth, or milk, too hot be given them, under the notion of imparting strength, we can easily conceive that these drinks would very seriously irritate an organ, the sanguineous congestion of which will dispose it to become disorganized.

Symptoms.—A child affected with œsophagitis vomits immediately the milk given it to drink, before digestion has had time to produce any change in it. It refuses the breast; nutrition is not carried on; it becomes emaciated without exhibiting the symptoms which usually belong to phlegmasia of other parts of the digestive organs; sometimes it vomits, besides drinks, other matters which have flowed from the stomach; but such a case is more rare, at least if there be not at the same time gastro-enteritis. There exists probably greater or less pain in the whole track of the œsophagus; but as the child is unable to indicate the presence of it, we cannot, by any exterior sign, be apprised of its existence. Yet the attempt might be made by endeavoring to excite the cries of the child by pressing the throat in the direction of the œsophagus.

Varieties of œsophagitis.—The alteration which accompanies œsophagitis is not always the same ; there may be simple or erythematic inflammation, inflammation with altered secretion, or gangrenous inflammation.

As œsophagitis almost always follows stomatitis, and as the latter exhibits to the sight the anatomical characters which distinguish it, we are led to believe that a child will be affected with œsophagitis, with aphthæ, or muguet, when the symptoms which we have pointed out follow stomatitis with aphthæ or muguet. It appears to me very difficult to be able to distinguish the existence of ulcers and of gangrene of the œsophagus, at least when the child does not vomit the shreds resulting from the disorganization produced in the œsophagus by the disease. Experience and ulterior observations may put it in our power to ascertain by the symptoms the existence of alterations in the tissue.

Treatment.—It will, in the first place, be necessary to abstain from giving to the young infant stimulating or hot drinks. It should never be allowed to take any drink but at the temperature of the breast milk. When it is perceived that the child vomits quickly after having taken the drink, a small quantity should then be given at a time, and a cataplasm applied to the throat, particularly when the peculiar symptoms of œsophagitis appear after stomatitis. A slight irritation in the digestive tube at a part far removed from the disease, should be established either by means of a few grains of calomel, or by the administration of small injections of sweetened milk; and the strength of the patient supported by the injection of a mixture of milk and broth, or of milk holding in suspension a small quantity of arrow-root or potato starch.

I have not noticed any nervous affections of the œsophagus in young infants; it is nevertheless possible that their vomitings may sometimes be owing to a spasmodic contraction of the tube ; but I am unable to support this assertion by any fact, and I must be content to speak with all the doubt appertaining to a simple suggestion.

I cannot terminate this chapter without speaking of the remarkable coincidence between inflammation of the œsophagus and vomiting—a coincidence to which authors have not fixed their attention. In almost all treatises on diseases of children, there is

a long chapter devoted to vomiting ; but no one has referred to œsophagitis as one of the causes of this morbid phenomenon. Yet the cases which I have reported sufficiently prove that vomiting is a common symptom of this disease, for I have chosen only those cases where the stomach was not involved, that nothing may complicate the study of the analysis of its symptoms.

If reference be made to the experiments of Bœclard, established for the purpose of elucidating the contradictions between the experiments of MM. Magendie and Maingault upon vomiting, it will be seen that this learned anatomist has ascertained that the œsophagus took an active part in vomiting ; that the stomach, compressed by the abdominal muscles and diaphragm, was also drawn up by the œsophagus, which, receiving the matters vomited, itself contracted upon them and expelled them by its own proper action. The facts which I have recorded, go to the support of these conclusions. Indeed if we suppose the œsophagus inflamed, we can conceive that it is without cessation stimulated by the irritation thus produced, and that it exercises frequent contraction, capable of provoking the ejection of matters contained in the stomach. It is perhaps to the habitual congestion of the œsophagus that the facility with which young infants vomit their drinks is owing. I have entered upon this physiological digression because it appears to me that all the parts of medical science are closely connected, and that we should always be ready to avail ourselves of an opportunity of assisting in the diffusion of that light which they are able to shed upon one another.

As vomiting is a symptom common to a great number of diseases, I shall not attempt to establish its value with reference to symptomatology, until I shall have caused all the circumstances under which it may be observed, to pass in review.

DISEASES OF THE SUB-DIAPHRAGMATIC PORTION OF THE DIGESTIVE TUBE.

This portion of the digestive canal, I divide into two parts—the stomach, and the intestines.

SECTION I.

DISEASES OF THE STOMACH.

Anomalies and malformations.—The stomach originally consists of a long tube, somewhat larger than the rest of the digestive tube, situated vertically, until the great tuberosity, which, at first, is scarcely apparent, begins to acquire a greater volume, thus changing a little the primitive form and direction of the organ. The œsophageal opening is of considerable dimensions during the whole time of gestation; the pylorus begins to narrow about the fourth month; and from the sixth month until birth, the valve surrounding this orifice becomes more apparent; and at the time of birth it is generally perfect, although the contrary assertion has been made.

The stomach exhibits anomalies, particularly with reference to its situation. There exist several cases of a total inversion of the abdominal organs; and the stomach often partakes of this derangement. M. Baron has met with several instances at the Hospice des Enfants Trouvés. The anomalies of form are also frequent; they are, however, but slightly developed: such as the strictures which appear in its length, and which divide it, as it were, into two or three parts; a disposition analogous to that which is observed in certain animals. It is very rare to see no communication between the stomach and duodenum, or to see but a very narrow opening into this intestine; yet Fleischmann, as quoted by Meckel, found a considerable stricture complicated with the absence of the pyloric valve.*

The entire absence of this organ is only observed in those children deprived, at the same time, of many of their other organs.

As to hernias of the stomach, they are possible under very peculiar circumstances, of which I shall speak when treating of abdominal hernias in general.

DISEASES OF THE STOMACH DEVELOPED DURING INTRA-UTERINE LIFE.

In order to be well assured of the pathological condition of the stomach in a young infant, its condition in health

* *Anat. génér. descript. et patholog.* t. 3, p. 430.

must first be known. Now, from the examination of the stomach in several embryos and fœtuses, it appears that the internal surface of this organ is of a light red color, more or less marked; that the internal membrane soon shows the existence of villi; that they are more evident than in adults; and that this internal membrane towards the fourth or fifth month, less adherent than the other membranes, may be separated from them with great ease. Meckel observes that it is very thick towards the fourth or fifth month of pregnancy. At first sight, it might be thought to be the case, but it should be remembered that the muscular coat is almost always raised with it; and the subjacent cellular membrane which, not being quite so distinct, is added to the mucous membrane, adheres to it, and is raised at the same time. At birth, the stomach of an infant is but little dilated. It encloses a quantity of ropy mucus, with which there is sometimes mixed some small grumous particles, apparently composed of concrete mucus. In still-born children there is found a layer of mucus, more or less thick, adhering to the surface of this organ. Upon raising it with the nail or the back of the scalpel, the internal membrane is seen beneath this layer perfectly healthy. This mucus disappears after a few days; and this is doubtless what several authors, and Capuron in particular, means by the name of *saburra*, the removal of which it was necessary to effect immediately after birth. We shall see that the same thing exists in the intestinal tube; when we shall be able to appreciate more fully the nature of the advice given for the expulsion of this substance.

The color of the contents of the stomach of a new-born child varies from that of the white of an egg to that of porraceous biliary matter. With mucus there are also sometimes found red or brown striæ; but the various alterations are attributable to causes, which we will consider when we shall have completed the pathology of the stomach.

Congestions.—Congestions of the stomach are of frequent occurrence in young infants; they vary from a ramiform and capillary injection, to a general violet tint of the walls of this organ. In order to obtain a satisfactory reason for these varieties, the kind of death must always be born in mind. As the child generally dies from asphyxia, it is very common to find in one born

dead a sanguineous congestion of the stomach, corresponding with the general plethora of the vessels of the abdomen in which the blood is generally found stagnated. Nothing is more common than to find not only the injection of which I have been speaking, but a certain quantity of blood exuded on the surface of the stomach, in children that have died in the womb, during birth, or some hours after birth. We should not be hasty, therefore, in attributing to inflammation these congenital congestions, if I may be allowed so to call them, and not to lose sight of the mechanical cause producing them.

Inflammations.—But it is not exclusively so in every instance; inflammation may really effect in the stomach of an infant during its sojourn in the womb, and give rise to disorganization too evident to allow their nature to be called in question. Let us, however, cite the facts in support of this assertion, which, without them, can only be regarded as conjecture.

CASE XXVIII.—Debuire, a male, just born, was exposed in the Crèche on the 7th of June, at 8 o'clock in the morning, and died in the evening, without having presented any other symptoms than painful cries, an almost permanent contraction of the face, and vomiting of brown matters. The post mortem examination was made the next day.

The limbs were robust, and the exterior of the body was in a good condition; the integuments were highly colored; the umbilical cord was a little shrunk.

A passive redness of a violet color was found in the pharynx, larynx, and œsophagus. The internal surface of the stomach exhibited several small white follicles, about the size of a millet-seed. The great tuberosity was perforated with irregularly round ulcers, resulting evidently from the disorganization of the mucous follicles, for some of them were still partially ulcerated. These ulcers were formed at the expense of the mucous membrane; the centre of each was of a bright yellow, and their borders, which were slightly tumefied, were of a carmine, strongly contrasting with the white membrane surrounding them; the stomach contained a quantity of ropy mucus, mixed with thick flakes of the color of bistre, and streaks of blood, the color of which was not altered. There existed a discoloration without softening, in the mucous membrane of the small intestines. There were several white follicles surrounded by a red circle

in the cecum; but they were not ulcerated. Some of these follicles were found in the colon, but in general this intestine was in a healthy condition.

The liver was gorged with blood; the bile in the gall-bladder was of a porraceous green; the lungs were gorged with blood; the fœtal openings had already begun to close; the brain was very much injected, and the pulp was soft; the vessels which were traced, were more in number, and nearer together, towards the corpora striata, and spread in rays in different parts of each hemisphere.

This case clearly proves the possibility of an inflammation of the stomach during the sojourn of the infant in the uterus—an inflammation, the effects of which were brought with the child when born, and which might give rise to symptoms which ought not to escape the attention of the physician; here it was the follicular apparatus that was particularly affected. Its disorganization was less advanced in the cecum. It would appear that the development was recent, for the child was not in the least degree emaciated, and the disease appears not to have arrested the progress of the fœtal evolution; it is probable then, that it was manifested in the last days of fœtal existence. The symptoms were confined to the pinched appearance of the face, to the painful cries, and the vomiting of brown matters. These signs may be common to all the other diseases of the digestive tube; yet I will here observe, that I have almost always seen vomiting of brown matter in cases of ulceration of the follicles of new-born children. They appear to me to have been the result of an alteration in the blood exhaled in the stomach, as the red streaks mixed with these matters sufficiently attest. Be this as it may, these symptoms, although vague, were sufficient to excite the solicitude of the persons having charge of this child.

M. Denis has observed these follicular ulcerations, of which he has given instances. I shall have occasion to speak again of them in the course of this work.

CASE XXIX.—Marie Arbuison was deposited in the Crèche on the 13th of November, 1826. She was born pale, thin, and feeble; as the emaciation was observed to increase every day, she was accordingly sent to the infirmary on the nineteenth of the same month—that is to say, six days after birth. The inferior extremities were

œdematous and hard; the body exhibited a general paleness; the mouth was dry; the skin dry and hot; the pulse very small; there existed an abundant diarrhœa; the cry was stifled, and could scarcely be heard; the left side of the thorax gave a dull sound upon percussion, where the respiratory murmur could not be heard. (*Gummed barley-water, milk and water.*) From the twentieth to the twenty-second, there was no other symptom present; the child vomited very rarely, and only a small quantity, of the drinks given; the cry became acute, short, and painful. On the twenty-sixth, the diarrhœa ceased, but it was followed by abundant vomiting; the child was constantly affected with dyspnœa; the extremities were of a violet color and infiltrated. Death took place on the twenty-eighth.

Upon examining the body, there was found a very intense redness, with tumefaction of the internal membrane of the œsophagus, especially at the lower extremity; the stomach, which was filled with gas, was white in almost all its extent, and its internal membrane was of a healthy consistence; but at the pylorus, and in a portion of the great curvature, there existed a deep, round ulcer, about two lines in diameter, with reddish-brown, perpendicular edges, and much elevated; there was no inflammatory tumefaction surrounding this ulcer, the bottom of which was black, and was formed by the serous membrane of the organ, for the entire thickness of the mucous membrane was destroyed. From its form, and the disposition of its edges, it appeared to be a disorganization of a muciparous follicle; it resembled, in every respect, the chronic follicular ulcers found in the ileo-cæcal region, in certain cases of phthisis. When the exterior of the stomach was observed in the part corresponding with the ulcer, there appeared a circular brown spot, surrounded by some branches of vessels slightly ramified. The small intestines were healthy; the colon was a little tumefied, and slightly injected. In the left lung, there appeared to be the commencement of hepatization. The fœtal openings were still free; the brain presented nothing but a slight injection.

The ulcer of the stomach, no doubt, existed at the time of birth. Œsophagitis supervened afterwards, and to the development of which must be attributed the abundance and frequency of the vomiting; this, together with the pneumonia characterized during life by the distinctive symptoms of this disease, were doubtless the principal cause of the death of this child; while the debility and blanched condition of the surface must be refer-

red to the ulcer in the stomach. This indolent ulcer, like many other chronic affections, might perhaps have been cured, if the other two inflammations had not concurred in hastening dissolution from the commencement.

Inflammation of the stomach, in young infants, may appear under another form, and may vary from a simple capillary injection to a disorganization, analogous to those which have just been described. Without doubt, it will sometimes be difficult to recognise the existence of this disease; yet when the physician sees any one of the symptoms of gastritis, which will be given below, he ought, without delay, to use those means which will be pointed out for its treatment.

DISEASES DEVELOPED IN THE STOMACH AFTER BIRTH.

It is a principle of some of the most ancient philosophers, especially of Anaxagoras, that *from nothing comes nothing*, and that every effect supposes the existence of a cause. This principle, applied to medical science, has been recently illustrated, with much ability, by MM. Béclard and Rostan.* They remark, with other pathologists, that a disturbance in the functions of an organ, supposes, in every instance, an alteration in the organ. Nothing is more true, and nothing more likely to mislead than this rule; but it must not be taken strictly according to the letter, and no false interpretation made of it, as it will thereby lose its importance and its truth,—for the functions of an organ may become disturbed, without the organ itself exhibiting any sensible alteration in its structure; yet the cause exists, and it is the duty of the physician to search for it, that the affection may be properly treated. The study of the diseases of the stomach and intestines, in infants at the breast, will demonstrate to us the truth of this remark, and we shall see the functions of the stomach disturbed without any apparent lesion existing in that organ. We might explain this phenomenon, *à priori*, in applying to the infant the symptoms which arise from the sympathies existing in adults, between the stomach and various parts of the body; but, faithful to the plan which we have marked out, we shall endeavor to seek, in the first place, for the causes which produce

* Béclard, *Anat. Gén.*, introduction. Rostan, *Traité de Diagnostic*, etc.

them, by the simple analysis of facts. In order to examine this subject in proper order, it will be useful to divide the diseases of the stomach in infants into two sections, and to consider—1st, the disturbance of the functions of the organ, without sensible lesion of its walls; 2dly, the organic lesion, with or without disturbance of the functions.

ART. 1.—Gastric Indigestion.

Infants very often vomit the milk they have taken, soon after it has been swallowed. Sometimes it returns unaltered,—at other times it is coagulated in masses of a greater or less size. Boerhaave, Van Swieten, Rosen, and since them, Underwood, MM. Capuron, Gardien, and others, have spoken of this morbid phenomenon, when giving the history of vomiting.

There exist various degrees of disturbance in the functions of the stomach; sometimes the child will only be affected with a simple regurgitation, which produces cough or hiccup; when a large quantity of milk has been taken at once, the stomach, considerably distended, rejects the superfluous food it contains; at other times the vomiting is the result of a true indigestion, for the ejected matters show, by their form and aspect, that the physiological action of the stomach has not produced such an alteration as would allow of their being absorbed.

When a child vomits under the circumstances first mentioned, it is easy to remove the cause; and such is the disposition, in some infants, to vomit, that the slightest movement that is given to the body while playing with them, or the hurried walk of the nurse, will cause them to discharge their drinks, or milk they may have taken.

Van Swieten and Rosen have remarked, that it is very common to meet with milk coagulated in the stomach, without being digested. The authors just mentioned attribute it to the superabundance of acid in the stomach. A very evident acid smell is often detected in the mouth of a child; like that, for instance, which is observed after an attack of indigestion. I found, in fifteen infants that died with other affections than those of the digestive organs, the stomach filled with coagulated milk; there were but three exhibiting a slight injection of the stomach; in the remaining twelve the walls of this organ were white and

perfectly healthy. I am inclined to think that this coagulation of milk proceeded from some cause other than inflammation. Does this result from the milk taken by the child abounding in caseum, or is it the presence of acid in the stomach that so quickly coagulates this fluid? Does this acid exist, in the first place, in the stomach? Is it the result of the decomposition of the milk? Does this indigestion depend upon the want of vital activity and nervous action, which is displayed in the stomach during the operation of the digestive functions? These are questions I am unable to solve; but whatever be the cause of this phenomenon, I point it out as the effect of a true gastric indigestion, without inflammation of the organ, and without apparent lesion of its walls; and I wish particularly to direct the attention of physicians to this fact, that they may not be led to conclude that a child is affected with gastritis, whenever it is unable to digest the milk that it has taken, or when the milk is vomited some time after, in a coagulated form.*

Yet it happens that the stomach being inflamed, the child cannot digest, and then vomits the milk it has taken; but the proper signs of inflammation will enable us to detect the existence of inflammation in the stomach, when connected with this vomiting, and serve to give us some knowledge of the lesion accompanying it.

There are still other circumstances, when the digestion is found to be altogether disturbed, where the stomach not only rejects what it has taken, but also the contents of the intestines which flow towards it. The cause of this may be either a violent inflammation of the œsophagus, as we have already seen, or an intestinal phlegmasia, an ileus, or some obstruction in the intestinal canal. When we speak of each of the diseases which produce disorders of the digestive functions, their influence will

* J. L. Petit has pointed out the particular manner of this regurgitation of the milk in nursing children. He has reported a number of experiments upon animals, in order to overthrow the opinion so widely spread, that it is an unfavorable symptom to see a child return the milk soured or coagulated. He has undertaken to prove that this double change in the milk is, on the contrary, one of the preliminary changes to which the milk is always submitted, to be thereby more easily digested. See his *Obs. sur la digestion du lait dans les enfans, qui sont à la Mamelle.* (*Traité de Malad. Clinrug.*) t. 3, p. 338.

be duly examined, for it is not derangements of the circulating or cerebo-spinal apparatuses alone that may cause the gastric digestion to be disturbed in young infants, and cause their vomiting.

Can infants at the breast be affected with gastralgia? This is difficult to prove, for gastralgia being characterized by pain, either continued or remitting, of which the stomach is the seat, and the child not possessing the faculty of referring to this pain, we are without the necessary evidence of its existence. Nevertheless, as we observe in other organs affected with nervous derangements analogous to those which occur in the nerves of digestion, we can suppose the existence of a morbid exaltation in the stomach of young infants; and it is, without doubt, this condition which several pathologists have wished to designate, in speaking of the excessive irritability of the stomach, and the spasmodic vomitings of infants; but it must be confessed that they have expressed themselves very vaguely on this subject, and without supporting their assertions by any facts, from the impossibility, doubtless, of collecting the necessary facts for its illustration. When Rosen speaks of vomiting, arising from mental emotions, and particularly from fear or from some shock, he refers, probably, to children of more advanced age than those whose pathology we are studying.*

Poisoning has been pointed out as one of the causes capable of disturbing the digestion of infants, and thus producing vomiting. This poisoning may arise from the ingestion of some injurious substance that forms on the metallic articles that may be given to the child to bite on, or in the vessels in which the drinks are prepared; but this accident is very rare at an age when the child is nourished by the mother's milk or thin pap.

The color of the matters vomited are not to be disregarded, for they can enlighten us as to the cause of the vomiting. To this point we will often refer, for it will, without doubt, throw considerable light on the history of the diseases of the digestive tube. I will only remark here that when disorder in the digestive functions has no other seat than the stomach, the substances vomited are always white, sometimes tinged with yellow, and are more frequently semi-liquid, or coagulated.

There is but little to be said upon the treatment of this species

* *Traité des Maladies des Enfants*, page 289.

of gastric indigestion. For the most part, these vomitings are of so little importance that they hardly require any attention. This is the advice of Underwood, who observes that nurses and mothers regard them as salutary, and consider them as evidences of flourishing health.

Yet when they are too frequent, when the child becomes pale and thin for want of nourishment, it is well to follow the advice of Rosen. The first thing to be done is to allow the child a very small quantity of drink at once, and if it should exhibit all the symptoms of indigestion, after having taken a quantity of milk more than corresponds with the capacity of the stomach, it will be necessary to excite its evacuation by tickling the uvula with a feather dipped in olive oil. And if it be found impossible for the stomach to digest the milk, on account of its abounding in caseum, could not artificial feeding be advantageously substituted for sucking, and the child be nourished by milk and water, or with whey? If neither of these will digest, it will be necessary to try some other kind of aliment—such as thin pap, gelatinous or farinaceous substances, as sago or arrowroot.

If these reiterated vomitings be accompanied by an evident exhalation of acid, when they are preceded or followed by the ejection of ropy mucus, without any symptom of gastric inflammation, it will be necessary to administer a few grains of magnesia. It is unnecessary to unite it with cummin, or any other aromatic, as recommended by Rosen, for it will act with more certainty without this mixture, or to have recourse to fennel water, in which to suspend it; but a spoonful of sweetened water is all that is needed for that purpose. M. Gardien advises an infusion of rhubarb, or magnesia and rhubarb; but it should be remembered, before it is used, that these means may be injurious if there exist the slightest inflammation of the stomach; that they are not rationally indicated because there is vomiting, for a number of causes, which we will consider successively, may produce it; and that, although it is possible that a disturbance in the function of the stomach may exist without an inflammation of this organ, yet, for the most part, it is produced by a phlegmasia or by an alteration in some part of the digestive tube. This will be proved in the course of our researches.

If the child has been poisoned, it will be necessary to ascertain

the nature of the poisonous substance, that it may be treated with the appropriate means. We will refer, for the necessary information on this subject, to the work on toxicology by Professor Orfila. We will only observe that the salts of copper or mercury, by which children at the breast are more often apt to be poisoned, are promptly neutralized by the administration of albuminous drinks, especially by those containing the white of an egg.

ART. 2.—Lesions of the stomach, with or without disturbance of its functions.

If I should take the symptoms of diseases for the bases of my division, I should be obliged to unite in this place diseases, the seats of which have no connection; for the various derangements with which the stomach is affected, give rise to symptoms so different that it is sometimes very difficult to group them together. But in dividing the affections which I have undertaken to describe, according to the anatomical lesions which produce them, I am naturally led to make a complete pathology of the stomach.

The diseases of the stomach, developed after birth, are divided into passive congestions and inflammations.

§ I. CONGESTIONS OF THE STOMACH.—We have seen that the stomach of a child just born is almost always injected with blood; if there should occur ever so little disturbance in the general or pulmonary circulation, the abdominal vessels become engorged with black fluid blood, which, flowing towards the capillaries, inject and engorge their branches, imparting to the abdominal surfaces an appearance more or less red. When the bodies of these children are opened, there is found on the internal surface of the mucous membrane, a ramified injection, characterized by its bluish appearance, and the deeper color of the depending parts, by the absence of tumefaction with friability of the mucous membrane, and particularly by the general congestion of the large venous trunks of the abdomen, of the liver and spleen, *venæ cavæ*, heart, and lungs. The blood which has accumulated in the vessels of the stomach is absorbed, penetrates mechanically to the cellular tissue, is infiltrated in the mucous membrane itself, and is exuded on the surface of this membrane, in such a manner as to color with greater or less intensity the

mucus with which it is covered; or a passive hemorrhage occurs.

The instances of passive congestions of the stomach are so numerous in children at the breast, that I could cite a large number of them; but I will confine myself to tracing the history of one case of congestion of the stomach, which exhibits all the anatomical characters that have been enumerated.

CASE XXX.—Auguste Bourbon, a boy, aged eight days, was brought to the infirmary on the 2d of May, by his nurse, who stated that this child was often on the point of suffocation; that he refused the breast, and did not sleep. He possessed a strong constitution; his face was puffed; the limbs œdematous and purple, and the respiration difficult; the cry, considerably altered, was smothered, and the reprise, husky and jerking, could be heard only for a moment; the pulse was imperceptible; the beatings of the heart very small and irregular, rising at the most to fifty in a minute; it occasionally happened that the pulsations were for a moment so small and so frequent that it was with difficulty they could be counted. The child was enveloped in hot wool, and frictions of “eau theriacale” were applied to the trunk and limbs. On the third, the upper lip was considerably tumefied, and the child vomited bloody matters. (*Lotions of sulphate of quinine.*) On the fourth, the sinking increased; the ejection of sanguineous substances continued, and death occurred that night without any other remarkable symptom.

The post mortem examination was made on the next day. There was found a tumefaction with a purple redness of the upper lip; the buccal membrane was of a violet color; the tongue was tumefied, and appeared ecchymosed at the base; the œsophagus very much injected; the stomach violet red in its whole extent; its walls, which were soft, and the membranes of which were easily separated, were infiltrated with black blood. The stomach contained a large quantity of substances of the consistence of mucus, and of a brown and bloody appearance, resembling in every respect the matters vomited. The liver was gorged with blood, and of an intense red; there existed on its surface a kind of sanguinolent dew, and pale liquid blood was found effused in the cavity of the abdomen. The left lung crepitated; the right was much engorged, and did not crepitate in the least; the pleura on this side contained a quantity of effused blood. The heart and large vessels were very much engorged, and the pa-

rietes of the heart were, as it were, soaked with blood, and a small quantity was found effused in the pericardium.

The vessels of the meninges, and of the surface of the brain, were considerably injected; the same was the case with the plexus choroïdes, and the cerebral pulp was of a deep red.

We see in this case that not only was the stomach the seat of a very considerable congestion, but also that all the other organs were in the same condition; that venous blood engorged every part of the blood vessels, and that it flowed in the most remote vascular ramifications, infiltrating the organs and coloring them, while it was even found exuded on their surfaces. Thus, then, this coloration of the stomach, effusion of blood contained in this organ, the sanguinolent vomiting observed during life, were, in this child, the result of a true passive congestion, which is very commonly met with at this period of life. It is true that the sanguineous congestion often consists of nothing more than a simple injection, and is not always accompanied by a state of sanguineous plethora as remarkable as was the subject of the preceding case; but, I repeat it, the sanguineous congestion of the digestive passages, in consequence of the difficulty or incomplete establishment of respiration and circulation, is a very common phenomenon in the first period of life.

The symptoms attending this passive congestion of the stomach are nothing, particularly with respect to the digestive apparatus, if the congestion be light; but if, on the contrary, it exist in a high degree, there will then appear some derangement in the digestive organs, and sometimes with sanguinolent vomiting.

But it is not simply in the digestive functions that we must look for the symptoms from which we are to infer the existence of congestion of the stomach; let us note that this is but secondary, that it is the effect of a cause which has existed before; and it is towards the seat of this cause that our attention is to be directed. Now, every time we see a child born with all the signs of sanguineous plethora, where we observe the respiration becoming established with difficulty, and the characters which we shall hereafter indicate as being those of pulmonary congestion, all uniting with sanguinolent vomiting; we shall then have reason to believe the existence of a passive congestion of the sto-

mach; because experience has proved that this lesion is, in infants, as in adults, the result of a disturbance in the circulatory apparatus. The treatment in such cases ought to be based upon the necessity of restoring the blood to its habitual channels, of relieving the tissue of the organs from the superabundance of this fluid, and, above all, to direct our remedies to the congestion of the heart and lungs.

Sanguineous evacuations are the proper means for accelerating the subcutaneous capillary circulation. The manner of accomplishing it will be detailed when we come to treat of the diseases of the circulatory apparatus. It is sufficient here to point out the object of the treatment.

§ II. INFLAMMATIONS OF THE STOMACH.—Gastritis is an inflammation of the mucous membrane of the stomach; but what shades does this inflammation present! What varieties of form and aspect do the pathological alterations which constitute this affection exhibit! In order to describe them all in proper order, I shall again follow the analytic method which was adopted when considering stomatitis, and will divide inflammations of the stomach in the following manner.

GASTRITIS.

Erythematic,
With altered secretion;
Follicular,
With disorganization of tissue.

All these modifications will be studied with reference to their anatomical characters, and the symptoms which accompany them; they may exist either in an acute or chronic state; one may succeed the other, and it is possible that several may exist at the same time.

§ I. ERYTHEMATIC GASTRITIS.—Erythematic inflammation of the stomach presents itself under the appearance of a ramified or capillary injection; of a redness diffused in patches to a greater or less extent; of irregular striæ, which very often follow the course of the corrugations of the stomach; and finally, of that of a number of closely approximated red points. These different appearances may be either accompanied or not by a tume-

faction and friability of the mucous tissue. Sometimes the mucus of the stomach is thick, tenacious, and more abundant than in the ordinary state; but this character of the inflammation is not constant.

The seat of the inflammatory ramified injection is in the vessels of the stomach; that of the capilliform inflammation is in their capillary ramifications; that of the patches, striæ, and red points, in the mucous membrane; and especially, as M. Leuret has remarked, in the papilla or villousities of the mucous membrane, which appear slightly tumefied. Nevertheless, this modification of erythematic redness may present itself independently of the tumefaction of the villi.

Erythematic inflammation of the stomach will be milder in proportion as the internal membrane is less friable and less tumefied. Of all the different kinds of redness that which we have designated as ramiform, is the result of the slightest degree of inflammation. The pointed capilliform or striated redness should be considered as the evidences of an inflammation more and more acute.

These various morbid aspects are very often the first degree of a very intense inflammation, great disorganization, or a transformation of tissue, and are observed separately or together in the same individual.

It is very easy to mistake a certain red appearance which is owing to a state of congestion, for an erythematic inflammation; it is necessary, therefore, to keep always in mind the seat of this redness, and the state of fulness or vacuity of the abdominal vessels. Passive redness is always found in the lowest parts of the organ, existing, at the same time, with a general congestion of the vessels of the digestive tube of the large abdominal trunk, and of the right cavities of the heart. Active or inflammatory redness exists more often independently of these circumstances, and frequently attends tumefaction and friability of the mucous membrane.

The anatomical characters of erythematic gastritis being established, let us now see what are the symptoms which correspond to it, and which together constitute the important part of the history of the disease. Here it is necessary to examine cases without prejudice, and select those without com-

plication, otherwise we cannot draw any just and precise conclusion.

CASE XXXI.—*Erythematic Gastritis*.—Louise Plantier, aged four days, remarkable for the color of her face, and the firmness of her flesh, entered the infirmary on the 1st of January, 1826, because she had refused the breast, and had vomited yellow acid matter either immediately or some time after drinking. (*Gummed barley-water, milk and water.*) On the 2d of January the vomiting increased,—the inferior extremities were œdematous, and hard to the touch, the face pale and pinched, respiration difficult, skin cold, pulse slow and irregular. The abdomen was not tympanitic, and could be pressed without giving pain; yet when pressure was made on the epigastric region, a sudden contraction of the face and the cries of the child indicated that she experienced pain. (*Sweetened water, milk and water.*) On the 3d of January there was a general sinking; the face became thin, and expressive of great pain; the child cried often, and refused every thing that was given her to drink, yet did not vomit; the stools were natural. On the fourth and fifth in the same condition; on the sixth she died. The post mortem examination was made the following day. The exterior of the body still retained much of its original embonpoint. The mouth and œsophagus were healthy; there was a very intense redness in the stomach, near its cardiac orifice, which extended the length of the lesser curvature. The mucous membrane in this part was much tumefied, and could be raised with the nail with great ease. In the remainder of the organ there existed a strongly marked capilliform injection. The intestinal canal, liver, and spleen were healthy. There was a small quantity of clear serum effused in the right cavity of the thorax; the lung of this side was slightly hepatized in the middle lobe; the left crepitated strongly. The trachea and bronchiæ were healthy, and so were also the heart, large vessels, and brain.

The disturbance in the digestive functions was not observed, except at the commencement of the disease. It ought also to be remarked, that the vomiting occurred, at all times, either a short or a long time after taking drinks,—that the physiognomy of the child, which was indicative of pain, almost constantly gave still greater evidence of its existence, on pressing the epigastric region,—that the abdomen was not tympanitic,—and, lastly, that notwithstanding this assemblage of local symptoms, there existed

no evident sign of febrile reaction, a circumstance, the importance of which will be considered in another place.

It is very rare to find, in infants at the breast, a simple inflammation of the stomach, without some portion of the intestinal tube being at the same time inflamed; and the symptoms of erythematic gastritis, like the case just mentioned, are far from presenting themselves in all children with the like clearness and simplicity. It must always be by the aid of an examination and close attention alone that it can be possible for us to separate them, and to distinguish them from the epiphenomena, or other accompanying symptoms.

Erythematic gastritis is almost always acute; yet it may become chronic; and then, taking a new character, may be replaced by ulceration, gangrene, or softening of the membrane.

The most common complication of this disease is enteritis; for in one hundred and fifty cases of inflammation of the sub-diaphragmatic portion of the digestive tube which I examined with care, there were ninety cases of gastro-enteritis, fifty of enteritis without gastritis, and only ten cases of gastritis without enteritis. From this statement the natural deduction is, that whenever enteritis is developed, we may infer the existence, at the same time, of gastritis. But whatever embarrassments a physician may experience in the diagnosis of gastritis in young infants, in consequence of the obscurity of the symptoms, and the frequency of the complications, this cannot have much effect on the treatment, since the proper means for the management of enteritis are also applicable to gastritis, and *vice versa*.

Yet the embarrassment of which we have spoken can hardly exist, except in the case of simple erythematic gastritis; for so soon as the mucous membrane of the stomach becomes the seat of a more strongly marked lesion, the symptoms then assume a more cognisable character; this is what we have already seen in reviewing the various modifications of gastritis pointed out above.

§ II. GASTRITIS, WITH ALTERED SECRETION, OR MUGUET OF THE STOMACH.—I have already demonstrated that muguet is nothing more than an altered secretion of the buccal or œsophageal mucous membrane. The same phenomena may occur in the stomach when the intestinal membrane becomes the seat of

inflammation. Some have vainly attempted to prove, by reasoning, that muguet cannot form in the stomach. I shall only answer by facts which cannot be doubted, because I will exhibit them with all their details, and with the fidelity necessary to remove any doubt existing on the subject.

This altered secretion is much more rare in the stomach than in the œsophagus or mouth; for, in two hundred and fourteen cases of muguet, observed in the medical infirmary of the Enfants Trouvés during the year 1826, I saw but three cases of muguet of the stomach, and only two of the intestinal canal; from which it follows that the mucous membrane of the digestive tube is much more exposed to the altered secretion constituting muguet in proportion as it approaches the buccal cavity,—that is to say, in proportion as it is found more immediately connected with the external air. Does the contact of the air with an inflamed surface contribute, in any degree, to concrete the secretion from that surface? This is a very natural question in this place, but one which is very difficult to answer. Whatever be the cause, let us listen to the relation of the cases of which we have spoken.

CASE XXXII.—*Muguet of the stomach.*—Louise Labry, aged 13 days, was placed under our care on the 8th of July. She was of a feeble constitution. Two days before her admission she had become pale, and refused the breast, although she did not vomit what she was forced to drink. On her entrance into the infirmary she exhibited an intense redness of the buccal membrane, and a thick layer of muguet spread on the internal surface of the cheeks and the base of the tongue. (*Gummed barley-water, emollient gargle, milk and water.*) On the tenth there appeared to be a commencement of marasmus; she vomited her drinks, but had no diarrhœa; abdomen was not tense. On the fourteenth vomiting of yellow matter supervened, and a much thicker layer of muguet was formed on the tongue and buccal parietes. Between the intervals of these membranous layers appeared the mucous membrane, of a deep cherry red. The skin was cold, the extremities purple, and the pulse small. The child died at night.

Post mortem examination.—Emaciation and general paleness of the integuments. There still existed a thick layer of muguet upon the tongue, pharynx, and œsophagus. The mucous membrane of the stomach was very red, thick, and friable; and a large layer of muguet,

composed of a considerable number of small shining white points, covering the villousities of this membrane, which together, might be compared to a thin coat of hoar-frost spread over fine moss. These white points, upon scraping them, could be raised with the scalpel, but they resisted rubbing with the fingers. Some detached points were found floating in the mucus of the stomach. None of the muciparous follicles could be seen. A few transverse red striæ existed in the duodenum, and there was found a passive ramiform injection in the ileo-cæcal region, and at the commencement of the large intestines; the liver, considerably engorged with blood, exhibited a green slate-color; the lungs and heart were healthy; the brain very much injected, and the longitudinal sinews filled with blood.

There was no symptom here which would have enabled us to have detected the presence of muguet in the stomach; yet, as the symptoms of gastritis supervened, after the appearance of muguet in the mouth, we are, therefore, led to believe that this pellicular secretion was not developed in the stomach, until after it had, in some sort, passed through the pharynx and œsophagus. Let us again note the absence of all symptoms of re-action, notwithstanding the violent inflammation of these parts; but, in place of generalizing, we will pursue still further the examination of facts

CASE XXXIII.—*Muguet of the mouth, stomach, and œsophagus.* On the 26th of August, 1826, Marie Galet, aged four days, entered the infirmary. She was small, feeble, and very pale, and was affected with a copious diarrhœa. (*Rice water; abstinence.*) On the 1st of September the edges of the tongue were covered with a few points of muguet, and the mucous membrane of the mouth became red and very dry. On the 2d of September the muguet formed a thick layer, the diarrhœa was suspended, the abdomen was retracted, and without pain on pressure. The skin was burning, and yet the pulse was so small that it was very difficult to feel it. (*Same treatment.*) On the 5th of September there was an extreme paleness of the face, and emaciation had commenced; the buccal membrane was continually covered with new layers of muguet. On the 8th of September, vomiting, which had not before been observed, occurred, and the child rejected all the drinks that were given. That part of the buccal membrane which was free from muguet, was of an intense

red; marasmus made rapid progress; the skin was not very warm; the pulse small, and did not beat but seventy to eighty in a minute. The face of the child gave constant indications of pain; several deep wrinkles were formed at the root of the nose, and the commissure of the lips was, as it were, drawn backward. She remained in the same state until the end of the month, when she became very much emaciated, with occasional diarrhœa, and constant vomiting; small points of muguet also appeared on the base of the tongue. In the beginning of September the vomiting continued, and the matters thus discharged were of a yellow color; the face was continually pinched, the abdomen shrunk, the lower extremities much wasted; the cry was feeble, and could scarcely be heard; stools were liquid, yellow, and scanty. The treatment was confined to a mild ptisan, and emollient gargles. After having arrived, insensibly, at the last stage of emaciation and feebleness, she expired on the 13th of September, at night.

On examining the body on the next day, the parietes of the mouth, internal surface of the lips, and the surface of the tongue, were found covered with a thick layer of muguet, which, in some places, could be raised in patches. The glottis was healthy, but the lateral walls of the pharynx were filled with a number of points of muguet; the entire internal surface of the œsophagus was also covered with it; it there appeared in the form of thick flakes, ranged in parallel lines, from above downward, between which the epithelium formed furrows of various depths; this extended to the cardia. Beneath the excretion, the epithelium appeared white.

The mucous membrane of the stomach, especially at the greater curvature, was very red and much swelled; but, at the lesser curvature, this membrane was covered with a large plate of muguet, resulting from the agglomeration of a number of small white shining peltic points, which resisted any efforts to remove them with the nail, but which were easily detached by cutting with the scalpel; the villi then appeared very prominent, red, and in a sort of turgescence or erection. When examined through a magnifying glass, there was discovered between them some appearance of muguet, and the summit of those scraped was bloody.

The small intestines presented here and there a slight redness; the large intestines were healthy; the liver was gorged with blood; the bile was limpid and green; the lungs were engorged at their posterior part; the fœtal openings had already begun to be obliterated; the brain was healthy.

In this case, as in the preceding, we find a thick layer of muguet in the stomach, but without any symptom that could indicate its presence; there existed solely symptoms of chronic gastritis and œsophagitis. It should be noted that the symptoms, at the head of which we place the vomiting of drinks and of yellowish matters, did not appear until after the appearance of muguet of the mouth, a circumstance coinciding with what was observed in the preceding case.

The following case exhibits muguet of the stomach complicated with follicular inflammation and gelatinous softening; this will naturally lead us to the study of other varieties of gastritis.

CASE XXXIV.—*Muguet of the stomach, gelatinous softening.*—Victorine Larue, aged six days, entered the infirmary on the 6th of September. She appeared to possess a moderate degree of strength; was affected with a diarrhœa, consisting of liquid yellow discharges; the abdomen was tense, and the integuments were tinged with yellow; the tongue was dry at the point; a very intense redness existed around the anus. (*Gummed rice-water, milk and water.*) On the 8th of September, the same general condition continued; the abdomen was more tender and painful about the epigastric region than in other parts, for the child cried when pressure was made on this part. On the eleventh, several points of muguet appeared on the edges of the tongue; the jaundice had disappeared; the skin was of a medium heat; the pulse natural, (eighty.) The same treatment was continued. On the twelfth, the diarrhœa ceased; vomiting of drinks took place; and the muguet continued to increase. On the thirteenth, the muguet had spread on the tongue and the parietes of the mouth under the form of a thick layer; the vomiting continued; the face was much altered, and a number of wrinkles were observed at the root of the nose, together with a retraction of the commissure of the mouth. For twenty-four hours, the cries and restlessness of the child were incessant, yet without any convulsive movement. The drinks which were given were vomited without any effort, and when the epigastric region was pressed, the child cried violently, and continued to cry until she became exhausted with fatigue and pain. Death occurred in the midst of these agonies on the 13th of September, without any febrile symptom having made its appearance.

The examination of the body was made on the next day, and a thick layer of mucus was found upon the tongue and the buccal parietes; the glottis was healthy, but the pharynx was covered with a

number of points of muguet; they also appeared in the whole length of the œsophagus, existing in the form of small agglomerated points, ranged longitudinally even to the cardiac orifice, where they ceased with the epithelium.

The mucous membrane of the stomach was red in most of its extent, and a gelatinous softening was found at the great tuberosity, about three inches in length, in the centre of which the stomach was perforated. The borders of this perforation were, as it were, fringed, and exhibited some thin filaments, as if recently torn. Near the spleen there was found an effusion of mucus from the stomach, yet no peritonitis existed. Several layers of thick mûguet, irregularly disseminated, existed on the mucous membrane of the stomach. There appeared in the lesser curvature a number of muciparous follicles, slightly tumefied, and surrounded by a red circle. Some of their orifices were open, and were of a red color. The villosities were every where prominent, and the mucous membrane was thick and slightly friable in the place where it was not softened.

Red transverse striæ existed the whole length of the small intestines; the large intestines were healthy; the lungs were crepitant; the venæ cavæ and the right cavities of the heart were gorged with blood; the brain was slightly injected.

This case may serve not only to furnish us with another instance of muguet of the stomach, but also with symptoms of gastritis. In fact, the vomiting, tension, and pain of the epigastrium, painful cries when this region was compressed, alteration of the physiognomy, the expression of which indicated the severe sufferings of the child even to the latest moments of life,—the whole together were sufficient to produce a belief of the existence of gastritis; and this supposition, which the observations of the symptoms enabled us to make, was fully confirmed upon a post mortem examination of the body. These three marked signs of gastritis, therefore, should not be forgotten; and when they appear even in ever so slight a manner, let them be carefully studied. In the science of diagnosis, we have need of all the assistance of reasoning to second our observations, and are often obliged to draw our conclusions from experience and analogy. The senses and judgment ought then to aid us continually in the study of diseases, that their seat and nature may be discovered. But let us return to our subject.

The gastritis which caused the death of this child, exhibited, at the same time, several varieties of inflammation. In fact, we found besides the erythematic redness, accompanied by a sensible tumefaction of the external membrane, an altered secretion constituting muguet; inflammation of the muciparous follicles, to which I reserved the name of aphthæ; and, finally, a softening, concerning the nature of which I shall presently offer some remarks. This case deserves our attention; it proves that the differences of inflammation arise the most frequently from a difference in their seat, and that the cause, or inflammatory stimulus, having acted on the stomach of the child whose age and constitution exposed it, at the same time, to all the shades of phlegmasia which can affect this organ, it is not surprising that all these affections should coexist.

But it will naturally be asked, by what sign is it possible to recognise muguet of the stomach? There is no positive symptom to mark the existence of this disease; yet it must be noted, that in the three cases just stated, evident symptoms of gastritis were manifested after the appearance of muguet of the mouth. Now, can it not be presumed, when stomatitis or œsophagitis with muguet has existed in an infant, a gastritis occurs, that the latter may also be accompanied with muguet? This will, nevertheless, be but a presumption, for muguet of the stomach is very rare. In this incertitude, the physician will remember that he has gastritis to encounter, and that the evidence of this affection is present in a very unequivocal manner, so as not to leave a doubt of its development nor of the means of treatment. Before entering on the treatment of gastritis in young infants, let us continue the examination of the varieties of this inflammation.

§ III. FOLLICULAR GASTRITIS.—We have already studied the inflammation of the follicular apparatus on the mucous membrane of the mouth and œsophagus; the stomach, where this secretory apparatus also exists, may present the same alteration.

The follicles of the stomach never exist grouped or accumulated in the form of plexuses, as in the intestines; but they are generally separate, and may experience two kinds of development.

They sometimes appear under the form of small, white, round, slightly projecting granulations, terminating in a black point, which marks their excretory orifices; sometimes they inflame.

tumefy considerably, and, finally ulcerating, become disorganized. In the former case they give rise to but few symptoms; in the latter, they are accompanied by the symptoms of intense gastritis, and may cause the death of the child.

It is rare for simple and uninflamed follicles to appear in the stomach alone, without showing themselves in other parts of the digestive tube; they generally occupy several points of the digestive tube at the same time, and generally show themselves developed in this manner at the period of the first dentition. I will return hereafter to the consideration of this general development of the follicular apparatus of the digestive tube.

But the inflammatory development of the follicles often occurs in the stomach alone, without showing itself in any other part of the intestinal canal. I have already given an example of follicular ulcerations observed in young infants. I noted the anatomical characters of these kinds of ulcerations, and observed that the vomiting, of a brownish sanguinolent material, may be the evidence of their existence. I will confine myself here to general considerations on this species of alteration.

During the year 1826, I examined fifteen cases of follicular ulcerations of the stomach; eight of these were in children aged from four to six days; six from eight to twelve days; and one only of them three weeks old. From this it appears that the younger children are, the more are they exposed to follicular inflammation of the stomach. In neither of these cases did any well-marked febrile symptom exist; they were *only* remarkable for their state of sinking and feebleness, the inevitable result of the pathological condition of the essential organ of digestion, the impossibility or disturbance of which process would quickly cause the feebleness and death of these children. Several of them were at the same time affected with other serious diseases; such as encephalitis, softening of the brain, pneumonia, and enteritis. One had gastritis alone, and to its progress and intensity the child appeared to succumb at the age of four days.

The diagnosis and treatment of this disease is contained in that of gastritis in general. The prognosis is unfavorable in proportion to the prostration, feebleness, and early age of the child; and also to the greater quantity of black sanguinolent matters vomited.

§ IV. GASTRITIS WITH DISORGANIZATION OF TISSUE.—The different varieties of gastritis which we have already mentioned, may lead to a true disorganization of tissue, since they are sometimes followed by ulcerations more or less deep; hence they might be mentioned here; but I shall now confine my remarks to the violent and sudden inflammation of the internal membrane of the stomach, under the influence of which a disorganization quickly ensues; such are gangrene and gelatinous softening of the stomach.

1st. *Gangrene of the stomach.*—Gangrene of the stomach is an occurrence quite rare in young infants. I have not often observed it; yet its development is possible, and may show itself, as in adults, under the form of various sized eschars, which, on being detached, give rise to perforations, followed by fatal symptoms. M. Denis has seen one case where “he found the mucous membrane of a deep brown, and diffusing an infectious odor, reduced here and there to a putrescent state, easy to be raised in soft shreds. These were macerated in a fluid, the color of the lees of wine, and it could only be attributed to gangrene from excess of inflammation.”*

I have seen an instance of destruction of the mucous membrane of the stomach to a certain extent, caused probably by gangrene supervening after violent inflammation. The following is the history of this interesting case.

CASE XXXV.—Alexandrine Liseman, aged three days, entered the infirmary on the 3d of March, with the following symptoms: On removing the clothes, a quantity of black blood was found, which had been discharged from the anus. The child also vomited the same in large quantities. She was healthy, and the limbs fat, and the whole surface of the body was jaundiced. There was but little movement; the face was pale; the lips discolored; the integuments flabby; the cry complete, but feeble; the pulse extremely slow and small. (*Sweetened water, dry frictions to the body.*) On the third, the same state continued. On the fourth, the stools were black and pitchy; the child, who had not ceased vomiting, ejected the same kind of substance. Yet the general heat of the skin was a little more elevated, and the pulse was also raised, beating about seventy; the

* Denis loc. cit. p. 55.

face less purple, but the cry continued feeble. (*Sweetened wine and water.*) The child died in the afternoon.

Post mortem examination.—The exterior exhibited a tolerably strong frame; the integuments were discolored; the mouth and stomach were healthy; but the mucous membrane of the stomach presented, near the cardiac orifice, a perfect destruction to the extent of a thirty sous piece, the centre of which was colored with black blood, and the edges irregularly fringed and black, and had the appearance of having been burned. Behind this black circle, the mucous membrane was thick, of a violet color, and was easily reduced to a pulp. The whole surface of the stomach was covered with semi-liquid substances, of a brown color, mixed with bloody striæ; and the mucous membrane beneath these substances appeared very thin and colorless, particularly near the pylorus. The small intestines were colored yellow by the bile, and contained some coagulated blood. The large intestines were healthy. The liver was exsanguineous and pale, the spleen small and slightly injected.

The lungs were healthy, colorless, exsanguineous, and very crepitant. The heart was white and empty; the large vessels were in the same state.

The base of the cranium contained a little bloody serum; the brain was very pale; the ventricles contained a little serosity.

It is evident that this child perished from hemorrhage, and every thing induces the belief that this was caused by the destruction of the vessels passing over the parietes of the stomach. The rapid progress of the gangrenous inflammation, the traces of which were still evident in the burned appearance of the borders, doubtless produced the loss of blood of which we have spoken. It is remarkable that a part of this blood flowed out from the intestines.

Corrosive poisons might doubtless produce in the stomach the loss of substance, analogous to that caused by gangrene, and possibly the follicular ulcerations of the stomach may assume the gangrenous aspect often found in aphthæ of the mouth. It would then be very easy to distinguish the primitive form of the ulcer, notwithstanding the modification produced in its appearance by gangrene.

2d. *Gelatinous softening.*—M. Cruveilhier was the first to describe the disorganization of the mucous membrane, which we

have designated, with him, by the title of gelatinous softening. He has traced, with much exactness, the assemblage of symptoms which accompany this disease. M. Baron has very frequently observed it in the Hospice des Enfants Trouvés, and the symptoms, according to him, are so well marked, that I have seen more than once an accurate diagnosis made by him when this disease existed.

I propose in the present article, to exhibit, as well as I am able, the characters appertaining to this disease, and to point out the symptoms with the greatest possible exactness.

I have already given an instance of gelatinous softening of the stomach, which existed at the same time with muguet and follicular inflammation. In this case the mucous membrane was reduced to a kind of thick pulp, resembling jelly in consistence; the parietes of the stomach were found so thin and fragile that the least force was sufficient to perforate it, and the most serious symptoms existed before the patient sunk. In the following cases we shall see the same affection develop itself in a still more evident and cognizable manner.

CASE XXXVI.—Marie Loumaison, aged seven days, entered the infirmary on the 4th of February, and remained there twelve days for muguet of the mouth, which disappeared after the use of a mild ptisan and emollient gargles. Yet the child was thin, pale, and very feeble. She was dismissed on the fifteenth. Notwithstanding she was put to nurse on the 18th of April, she continued to grow thin and pale, and exhibited, particularly at night, a slight turgescence of the legs and face. On the 21st of May she re-entered the infirmary in a state approximating to marasmus. She vomited, besides the drinks and aliments, liquid yellow matters; the face expressed pain, the commissure of the lips was almost always drawn backward, and vertical wrinkles were formed at the root of the nose; there existed no diarrhœa; there was a slight difficulty of respiration, and sometimes cough. These symptoms, and this general marasmus, continued until the 9th of May, when a new series of affections arose. Several points of muguet showed themselves on the tongue, the surface of which was red and dry; the vomitings, besides the drinks, were of yellow and sometimes green substances; the expression of the face was much altered, and indicated the existence of pain. The forehead was covered with a number of transverse wrin-

kles; the face was very thin, and occasionally livid; the pulse small and slow; the skin dry and burning, particularly about the arms; all these symptoms indicated the approaching end of the child; and on the 14th of May she died, having exhibited throughout, the same symptoms. The treatment consisted of ptisans and demulcent gargles. The examination of the body was made on the next day.

Exterior.—A general paleness, complete marasmus, infiltration of the lower extremities, and distention of the abdomen. The mucous membrane of the mouth was covered with a few points of muguet. The œsophagus was pale, and the stomach of a yellow white color in its whole extent; but at the greater curvature the mucous membrane was very much tumefied and white, and so soft that it separated, on touching it, in the form of a pulp. Upon pressing this membrane there exuded between the fingers a serous fluid, which, on being received on a watch-glass, congealed at the end of half an hour, having the same appearance and gelatinous consistence as that on the stomach. The other coats of the stomach appeared as if macerated in the same fluid, and were ruptured with the greatest ease upon the least force. The small and great intestines were colorless throughout their whole extent, and the mucous membrane, without presenting the tumefaction and the gelatinous appearance which existed in the stomach, was reduced to a soft pulpy matter. Some follicular patches situated in the ileo-cæcal region, were tumefied and of a slate color. The fœtal openings were obliterated; the lungs healthy, and the brain slightly injected.

We see in this case, that it was after a state of feebleness, caused doubtless by a phlegmasia of the digestive passages, and particularly of the stomach, and which had scarcely left any traces of the active stage, that this gelatinous softening supervened: this softening being always characterized by a serous infiltration of the pulmonary tissue, and in the parietes of the stomach. Is this serous accumulation then one of the causes of this gelatinous appearance and softening of the internal membrane of this organ? Does there exist any analogy between this softening and the serous infiltration which accompanies gangrene of the mouth? These questions are natural, for they arise from the appearance and form of the alteration; let us see whether other cases present any thing analogous.

CASE XXXVII.—Eugénie Rouillard, aged four days, of a good constitution, exhibiting, over the whole surface, a slight icterous tint, entered the infirmary on the 23d of August. From the morning of the twenty-second, she had passed by stool a large quantity of liquid green fœces, and had also vomited a quantity of green fluid. (*Gummed rice-water, milk and water.*) On the twenty-fourth, the physiognomy was much altered and the face pinched; the cry was frequent and painful, indicating the existence of much distress; from the constant motion of the features, and of the globe of the eye, one would have been led to believe that the brain was affected, of which the convulsive movements appeared to be an indication. M. Baron pronounced it to be a case of gelatinous softening of the stomach. On the twenty-fifth, the vomitings continued, and the child ejected, besides drinks, a quantity of green matter. A slight inflammation of the left palpebræ appeared. (*Sweetened barley-water, emollient collyrium.*) From the twenty-fifth to the twenty-eighth, the same state continued; emaciation made rapid progress; the face expressed great suffering, but the general agitation was succeeded by an almost constant prostration. On the twenty-eighth, all the buccal membrane had become of a deep red, and was covered with muguet; the vomiting continued, but the diarrhœa ceased. There was no change until the 6th of September. From that time to the twelfth, she gradually sunk, after constant vomiting, into a state of extreme prostration, the pulse being throughout feeble and small, with a general discoloration of the body and limbs. On that day she died.

On examining the body, some remains of muguet were found on the tongue and along the œsophagus; the stomach, at its great tuberosity, presented a gelatinous softening of the mucous membrane to the extent of two inches, which appeared pale and mixed with yellow streaks, and was so tender that it separated upon pouring on it the small stream of water used in washing it. When this was raised, the muscular coat—the fibres of which remained whole—formed, with the serous coat, the bottom of this disorganization. The circumference of this softening was surrounded by a very red ring or fold, formed of the mucous coat, which at this place was not softened, and which, when cut, appeared as if infiltrated with bloody serum. The remainder of the surface of the stomach presented some irregular red streaks, and in certain parts a very intense capillary injection. Red streaks were observed both in the small and large intestines. The lungs, heart, and brain were in a perfectly healthy condition.

Here we see gelatinous softening, accompanied by traces of a very severe acute inflammation. The circumstances under which this case was observed, and that which we just before described, were altogether opposite, from which it may be concluded that gelatinous softening is not more the result of an acute than of a chronic inflammation. We have also observed here the accumulation of serum, the presence of which contributed much to impart to the disorganized stomach the gelatinous aspect presented by the mucous membrane. The concretion of serum, expressed from the stomach of the first of these two cases, supports this opinion. The disorganization was not sufficiently advanced to cause a perforation of the organ, as existed in the xxxivth case, where the softening was complicated with a follicular phlegmasia. In the three instances reported in this work, and in four others in my possession, but which are too long to mention here in detail, I have always remarked the afflux of serous fluids towards the stomach; we have reason to conclude that it always preceded the softening; that it furnishes, as it were, the materials for this softening; and that it essentially concurred in giving the jelly-like appearance presented by the macerated and softened mucous membrane, this serum being mixed with the blood drawn thither by the inflammatory stimulus. If our conjecture be well founded, the softening ought always to occur towards the most dependent part of the organ, for it is in that part that the fluids generally accumulate; and experience proves that it is at the great tuberosity of the stomach that this disorganization occurs. This is what I have observed in the history of the seven cases of gelatinous softening in my possession, and M. Baron informs me that his experience has always confirmed this remark.

What inference shall be drawn from the preceding facts and considerations? None other than that the gelatinous softness of the stomach consists in a disorganization of the mucous membrane of this viscus, caused by an acute or chronic phlegmasia; that this disorganization is characterized by an accumulation of serum in the walls of this organ, the intumescence and gelatinous consistence of the mucous membrane in a part usually circumscribed, situated more frequently in the greater curvature, and about which the membrane exhibits more or less evident traces of an acute or chronic phlegmasia; that this disorganiza-

tion of the mucous membrane involving that of the other coats, may produce the spontaneous and fatal perforations which promptly cause the death of the patient; that they may arise not only at the period of the first dentition, as in the greater number of cases observed by M. Cruveilhier, but also in very young children, instances of which I have reported.

The softening now under consideration must not be confounded with another kind of softening which does not usually succeed an acute inflammation; the nature of which will be considered when we come to speak of all the phlegmasiæ of the digestive tube.

I shall not attempt to discover the particular cause of this serous accumulation which accompanies the gelatinous softening. Perhaps I ought to have examined the state of the blood in the surrounding veins, in those that died of this affection, to ascertain whether the course of the blood had been interrupted by concretions of fibrin—a circumstance which, it is well known, sometimes produces a serous infiltration; but this investigation did not occur to me, and it remains, therefore, a deficiency to be hereafter supplied. I shall not attempt to mention a thousand suppositions which the imagination here suggests, on the probable cause of this disease, for I do not record in this work any other conclusions than those drawn from positive facts; finding it impossible to explain satisfactorily the immediate cause of this softening, I must content myself with pointing out all the circumstances accompanying it, and hasten to present, at one view, the symptoms by which it may be recognised during life.

M. Cruveilhier has already traced these symptoms with great fidelity. Some of the particular signs which he has pointed out, will be recognised in the description I shall give.

This disease usually commences with symptoms of violent gastritis, such as tension and pain in the epigastric region; the substances discharged by vomiting are not only the milk and drinks, but yellow and green fluids, occurring either immediately or a long time after eating or drinking. There sometimes exists a diarrhœa, varying in different subjects. It will return after having ceased for one or two days. The stools are often green, like the matters discharged by vomiting. The skin is cold at the

extremities; the pulse generally irregular, is, however, very inconstant; the face continually expresses pain, and is wrinkled, as if the child were crying; the cry is painful, and the respiration jerking; and the general restlessness induces a belief of the existence of a cerebral affection. To these symptoms succeed a general state of prostration and insensibility, occasionally disturbed by the return of pain, producing, from time to time, the same restlessness which appeared at the commencement of the disease; and lastly, at the end of six, eight, or fifteen days, and sometimes later, the patient sinks, wasted by wakefulness, continual vomiting, and pain. In very young infants scarcely any fever is manifested in the midst of this disorder. When the disease is chronic, the progress of the symptoms is slow.

This group of symptoms, and the lesions which are observed in children presenting them, give to the disease some resemblance to spontaneous perforations, caused by a partial softening of the mucous membrane of the stomach, a long time since observed by Chaussier in lying-in women, and which MM. Cloquet, Andral, Louis, and several others, have observed in adults of different ages and sexes. The gelatinous appearance which this softening presents in infants, arises probably from the facility with which, at that age, the cellular tissue which enters into the composition of the organs is infiltrated with serum.

The treatment of this disease is included in that of gastritis in general; but it ought to be here more prompt and energetic, for it is a disease of frightful progress, and demands our closest attention from the first appearance of the symptoms; we shall return to it when speaking of the treatment of gastritis.

Treatment of gastritis.—One of the first indications in the treatment of this disease, is to suspend, as early as possible, the functions of the organ, and, of course, to wean the child. Stomatitis, it will be recollected, whether accompanied or not with muguet, is easily cured by applying to the buccal membrane a small pencil, steeped in a decoction of marshmallows. The child ought then, at the beginning of gastritis, to drink a weak decoction of the root of marshmallows, sweetened with simple syrup. Yet it should be mentioned that young infants do not bear abstinence well; therefore during the time of separation from the breast, the child ought to be nourished by means of injections

made with a decoction of rice or groats. Injections of tepid milk, particularly if they be sweetened, may produce diarrhœa. M. Guersent has observed this, and he often employs it to produce a motion. Having myself been consulted by a nurse whose child was affected with acute gastritis, I advised her to wean it for some time, directing also the administration of warm milk in injection for nourishment. It was followed in twenty-four hours by diarrhœa, which did not cease until the use of the injections was suspended. I then advised the white decoction of Sydenham; of this the child took six ounces daily at three different times. This fluid was entirely absorbed; a small quantity of a weak decoction of marshmallows was given frequently, and in eight days the symptoms of gastritis disappeared.

The application of a cataplasm to the epigastric region ought not to be omitted. Leeches to this part do not generally succeed, for the infant is uselessly debilitated by their use. M. Baron, who has often made the attempt, has, at last, renounced them. I am disposed to think, however, that when gastritis presents very serious symptoms, as will lead us to apprehend a disorganization of the stomach, such as gangrene, gelatinous softening, etc., we should not hesitate about applying two or three leeches to the epigastrium. A large number would be injurious. I have often seen robust children reduced to a true exsanguined state, by the application of four to six leeches to any part of the body whatever. M. Baron, on this account, does not generally resort to blood-letting but with the greatest caution in young infants.*

Derivations, particularly with frictions of tartar emetic ointment on the epigastric region, may be employed with success in chronic gastritis; but when evident prostration follows these violent symptoms, care should be taken not to use tonics and stimulants—such as wine, decoction of bark, of polygala, serpentaria, etc., bearing in mind that the prostration is often caused by a great disorganization of the stomach, as has been demonstrated in the history of gelatinous softening. The brown substances often vomited by new-born children, being a true indication of follicular ulcerations of the stomach; under these circumstances

* See Appendix.

we should refrain from giving wine, or any other stimulant, with a view to strengthen the patient, but should allow it to suck in small quantities.

The general treatment which I have described, is applicable to every modification of gastritis ; but the more severe the symptoms the more energetic should be the treatment.

I shall terminate the history of inflammation of the stomach with one important observation. It is, that this inflammation does not always produce symptoms as distinct as those noted in cases reported in this article. There are some instances in which the affection is concealed by other diseases ; and there are others where only a part of the symptoms mentioned are seen ; and again it will sometimes be developed in so latent a manner, that it is almost impossible to form a diagnosis of the disease, while it is, as it were, consuming the days of the child. I shall have occasion to refer to some other instances, when detailing the history of the affections of other organs. I shall confine myself here to the observation that the existence of an affection of the digestive organs may be suspected, however slightly apparent the symptoms may be, whenever the digestion is disturbed, and the child is gradually wasting away.

SECTION II.

DISEASES OF THE INTESTINAL CANAL.

§ I. DEVELOPMENT OF THE INTESTINAL CANAL.—The first rudiments of the intestinal tube in the human embryo, have not as yet been observed with sufficient exactness to allow of the history of its evolution to be correctly given. It is rather by analogy and induction, than by direct observation, that any data upon the form of the rudiments of the intestines can be established. Yet the works of those celebrated anatomists, Meckel, Oken, Wolf, and Tiedmann, have conducted us to results, which, if they are not incontestably true, are, at least, very probable.

Thus it appears to be proved that the intestinal tube, at first, consists of nothing more than an oblong vesicle, which, elongating at the same time both superiorly and inferiorly, forms at

both ends an imperforate canal; but which soon opens both at the mouth and anus. Other anatomists have asserted that the intestinal canal was formed in the lateral parts, which, by the law of conjugation established by Serres in organology, advanced, as it were, towards each other, and uniting anteriorly in this manner, completed the hollow cylinder of the intestines. Rolando supposed that the intestinal canal was formed in separate portions, and afterwards united.

The primitive situation of the intestinal tube has also given rise to numerous conjectures. Some suppose it primitively situated against the vertebral column, others at the anterior part of the abdomen at the base of the umbilical cord, and communicating directly with the umbilical vesicle. Velpeau says that it is enclosed in one of the swellings of the cord, where it is found surrounded by a serous fluid, in the middle of which is seen a small quantity of yellow matter. Wolf and Meckel say that it is only situated near the umbilicus when it has undergone a sort of bending forward, and being thus curved, it forms an angle more or less acute, which goes to the base of the cord in passing through the umbilical opening.*

I shall not here enter into the examination of these various opinions; but shall mention only an essential fact, which has some bearing on the pathology of new-born children. It is this, that at the commencement of the evolution of the fœtus, the anterior part of the abdomen is formed of a kind of expansion of the base of the cord, and that the intestinal tube adheres posteriorly to the vertebral column, spreading forward to the base of the cord, where, during the first months, the intestinal convolutions are lodged. This fact, which is merely alluded to for the present, will be hereafter considered when we treat of the subject of abdominal hernias.

Whatever be the mode by which the intestinal apparatus assumes the form of a tube, it is found, at the third or fourth month, perfectly convoluted, terminating above in the stomach, and below at the anus. The cavity is, at this time, very narrow,

* Further details may be found in Meckel's Manual of general and descriptive pathological anatomy, v. 3. Ollivier, art. *Oef du dict. de méd.* Ph. Béclard *Essai sur l'embryologie, Dissert. inaug.* Paris, 1820.

and the younger the fœtus, the shorter is the intestinal tube. From the sixth to the eighth month, the proportions of the intestinal tube are nearly analogous to those of its different constituent parts in adults; thus, at this period, the convolutions of the small intestines are very numerous; and the sacculi of the large intestines are formed about the fifth month, according to the observations of Morgagni. The proportion at this time, between the small and large intestines, is as eight to six. These observations have been made by Haller, Sæmmering, Wrisberg, and Meckel.*

Meckel has also remarked, that towards the commencement of the third month several longitudinal folds appear, and that about the end of the fourth month the villi are seen under the form of a number of elevations. About the seventh month the valvulæ conniventes form; from this period until the ninth month, the abdominal circulation is very active, and a number of vascular ramifications are observed to appear, first on the mucous membrane, and afterwards on the exterior surface of the intestines. From this habitual congestion of the digestive tube, there results a rose color of the internal coat; which, in consequence of the engorgements of its vessels, is easily detached from the serous membrane. In very young infants the muscular fibres are but slightly developed, so that the peritoneal membrane and the mucous membrane are in close approximation.† The cæcum begins to appear from the sixth to the ninth week. It assumes, by degrees, its form and relative proportions. Lastly, the great omentum, which before the second month had not appeared, at last begins to show itself on the loose edges of the stomach, and at the period of birth acquires some size; but during the whole of the intra-uterine life remains extremely thin, and it is not until after birth, that it becomes thickened by the development of the adipose tissue, which increases in growth more or less, according to the natural tendency of the individual. I shall not here speak of the glandular or lymphatic apparatus, which forms an appendage to the digestive tube, because they will be considered in another place.

* Ph. Bèclard, *Dissert. inaug.* p. 79.

† Ch. Billard, *De la membrane muqueuse gastro-intestinal, dans l'état sain et dans l'état inflam.* Paris, 1826.

While the intestinal tube undergoes these changes, and the different portions constituting it form a union by which the canal is to be completed, and in which the organs, together with the internal membrane itself, were pouring their secretions for lubrication and perhaps for nourishment, a series of phenomena constituting a species of intra-uterine digestion, has commenced, the duration of which is about two-thirds of the fœtal life, and which terminates at birth. This digestion of matters spread or secreted throughout the digestive passages, bears some resemblance, in reference to its duration, to that of hibernating animals.

If this be so, the intestinal tube of a young infant just born will, on examination, exhibit all the anatomical phenomena which the digestive apparatus of an adult presents who had died during digestion. This is, in truth, what the digestive organs of new-born children exhibit. Let us stop, then, for a moment, to consider—1st, The form and aspect of the organs of digestion in a new-born infant; 2dly, The nature and physical qualities of the matters contained in the digestive tube; 3dly, The manner in which the first alvine evacuations are made, and the phenomena which attend it. All this is of importance to know; for to appreciate properly the various pathological conditions of the intestinal tube of young infants, it is absolutely necessary to be familiar with the true characters of this organ in a state of health.

The duodenum has a rosy appearance, which is continued to the jejunum, but is less remarkable in the ileon. The jejunum has some traces of the *valvulæ conniventes*; the villi are equally developed, and very often in the jejunum are found some separate mucous follicles, about the size of the head of a pin, and almost always white; some follicular plexuses, slightly projecting, also white, and often with a little black point on the top, as observed in adults, are met with in the ileon. The ileo-cæcal valve is a little projecting, and the opening which it surrounds, extremely small. In most children it would be difficult to pass even a crow-quill; at this age it prevents the regurgitation of substances, and even gas, from the great intestines to the small, but allows a free passage for the contents of the small intestines into the large. This can easily be proved by passing a current of water through one or the other of the extremities of the digestive tube;

in the one direction the water passes freely, while in the other it will meet with an insurmountable obstacle. Neither do the cæcum nor colon as yet present their depressions and prominences in as distinct a manner as afterwards, or as they appear in adults.

After birth the internal membrane of the digestive passages gradually loses its habitual color, and becomes of a milky white, and continues for some time flocculent. During the whole of the first year it is remarkable for this appearance, and for the abundant secretion of mucosity.

The matters contained in the intestinal canal of a young infant vary with reference to their color and consistence. Generally there is found in the duodenum and jejunum, thick mucous substances of a white color, adhering to the walls of the intestines, sometimes collected together in certain parts, and sometimes spread over them. They are often colored yellow, owing probably to the bile; and there are also found balls or small masses of a green color, which is observed in the intestines a long time after the expulsion of the meconium. I have found them in a child eight or ten days old; it would appear that they did not possess any irritating property, for their contact never produces inflammation of the mucous membrane. It is very common also to find about the ileo-cæcal region, an accumulation of yellow and frothy liquid; the large intestines are always filled with meconium, of the consistence of pitch, and of a deep green color—a circumstance noted by all authors.

Such are, in the ordinary state, the varieties of aspect presented by the matters contained in the intestines. The meconium—that is to say, the thick, pitchy, green substance, which may be regarded as the result of fœtal digestion, and which may also be compared to the fœces in the colon of an adult—does not generally assume the physical characters which have been assigned to it, until it has arrived at the large intestines; and when it is found at the commencement of the small intestines, and even in the stomach, it is because it has ascended thither by a true antiperistaltic movement.

Yet there have been very singular aberrations observed with respect to this general rule. Such, for example, is the extraordinary case of meconium filling the imperforate œsophagus of an acephalous child, the account of which has been given by M.

Lallemand, and of which we have before spoken. Are we not led to believe, after this curious fact, that the meconium formed by the waters of the amnios which had been swallowed, and by the mucus secreted on the surface of the intestines, acquired physical properties in consequence of its prolonged contact with the digestive tube? And if it be met with in the colon, is it not because this portion of the intestines receives generally the first of the intestinal matters, and which are found abounding in this part in proportion as they are introduced, or have been secreted in the intestines? This view of the subject accords with the opinion of physiologists, who think that the nutrition of the fœtus is carried on not only by means of the placental circulation, but also by the liquor amnii.* But let us return to the subject, and to the description of the varieties of aspect, which the healthy state of the mucous membrane of a young child presents.

When all the liquid parts of the intestinal tube are removed, there still remains a layer of thick mucus adhering to the internal surface of the canal, forming on it a kind of plastering. This layer may be raised with the nail, under the form of a pellicle, resembling, to a superficial observer, portions of the mucous membrane itself.

It is probably this layer of mucus that certain practitioners regard as vitiated matters, or saburra, for the expulsion of which they have recommended purgatives from the time of birth.

But whether this mucus be for no other object than protection of the mucous membrane when exposed to the contact of unaccustomed aliments, or whether it be a simple deposit of a fluid contained for a long time in the alimentary canal, attaching itself, without any use, to its surface—it never remains there but for a short time, and detaches itself, without the assistance of any purgative, by a kind of natural exfoliation.

This exfoliation occurs in very thin lamellæ, which, being rolled together, form the small, white flocculi so frequently met with in the stools of young children; and where the surface of the duodenum or jejunum is colored with bile, it is this layer of mucus that is colored, so that, in removing it, the color also disappears from the intestine.

* Lobstein, *Essai sur la nutrition du fœtus*. Strasburg, 1802.

I will here stop to make an observation worthy of attention. It is well known that the meconium always colors the mucous membrane green, with which it is contact. But it often happens, when it is evacuated, that it carries with it some pellicular fragments of the mucous coating of which I have spoken, by which species of exfoliation the colon loses its green color. If the meconium be very liquid, it is quickly expelled, leaving after it the green coloring; but it sometimes passes off by little at a time, and then the colon presents, alternately, irregular patches of green and white. This can easily be ascertained by raising the meconium gently from the surface of the colon with the back of a scalpel. The membranous pulp, and the fragments of mucus, together with other intestinal matters, will be seen to be raised at the same time, leaving the internal membrane colorless.

As soon as the child has commenced a new kind of alimentation, the contents of the intestines change their appearance, the phenomena of digestion becoming, with respect to the manner in which it is performed, analogous to what it will be during the remainder of life. A great deal of importance is usually attached to the first discharges from the bowels; and nurses are eager to administer to a child just born, some mild purgative, under the fear of retaining, for too long a time, a substance which absurd prejudices have induced them to regard as irritating, and as capable of exercising a serious effect on the system. I am far from entertaining any such ideas, for I can see in the meconium no irritating or chymical property; but I conceive that a prolonged retention of this fœcal matter may produce, if it be not evacuated, effects analogous to those which obstinate costiveness produces in adults. Without, therefore, establishing any general rule for the administration of laxative drinks, I think it rational to recommend a small quantity of syrup of rhubarb, or an injection composed of warm water and olive oil, to those infants who, without having any malformation, are slow in passing the meconium.

§ II. MALFORMATIONS OF THE INTESTINAL TUBE.—Sometimes a greater or less portion of the intestinal tube is deficient in acephalous children. Often but a portion of the small intestines is found with the large, or the large intestine alone. The other primitive malformations may be referred to division, obli-

teration, dilatation, and strictures of the digestive tube in some of its parts.

Division, or interruption of the intestinal canal, has been noticed in different parts, but particularly in the small intestines. Dr. A. Schaefer, in publishing a case of division of the intestinal canal into several portions, has enumerated almost all the analogous cases furnished by authors, and has added to this dissertation several judicious reflections upon the possible causes of this malformation.* I shall not follow him in all the details of his memoir, nor seek to demonstrate whether these interruptions of the digestive tube result from the principle of the formation of the tube in distinct portions; but will keep myself to the object of this work, and endeavor to acquire a correct knowledge of the symptoms which a child, affected with this infirmity, exhibits.

The child which forms the subject of M. Schaefer's memoir, was born at Wurzburg, in December, 1824, at the full time. Considered externally, it was well formed, but slightly jaundiced. It complained much, and voided neither excrement, meconium, nor urine. It swallowed the liquids which were given, but soon vomited them. The vomitings consisted of brown liquid, resembling the meconium; the child, after becoming much emaciated, died on the seventh day after birth.

Upon examining the body, all the organs were found healthy except the intestinal tube, which presented the following appearances. The stomach was situated more vertically than is usual at this age, and more pushed back in the left hypogastric region, and was filled with liquids which had been swallowed by the child. The duodenum was so much distended that it exceeded in volume that of an adult. The third part of this intestine, after having passed through the mesocolon, terminated in a cul-de-sac; the pancreatic duct, and the common duct of the liver, opened into the duodenum in the usual manner; the whole of the intestine was full of a brown fluid. The rest of the intestinal canal was very narrow, and its cavity contained a small quantity of white, viscid, albuminous matter, which, in the ileon, appeared to be reduced to little balls; the duodenum was an inch and a half wide, and nine inches and ten lines in breadth.

* See *Journal complément. du dict. des sciences méd.*, t. 24, p. 58.

The remainder of the small intestines was thirty-four inches long, and two lines and a half broad, and the large twelve inches six lines long, and two lines and a half wide. The length of the cæcum was two lines, and that of its appendix twenty-one lines.

I met with an analogous case in the Hospice des Enfants Trouvés, the history of which I will give in detail.

CASE XXXVIII.—Théophile Taillebois, a male child, aged one day, of a feeble constitution, entered the infirmary on the 3d of April, 1826. The integuments of this child were slightly colored; the circulation was slow, and the motions feeble. On the fourth, he vomited the milk and sweetened water that had been given; the respiration was difficult; the cry painful, and smothered; the pulse very slow. The meconium had not passed since his birth; yet the abdomen was but slightly swelled. On the 5th of April, he vomited an abundance of yellow fluid, and on the sixth he died.

The exterior of the body presented but a slight icterous appearance. The mouth, œsophagus, and stomach were healthy; the duodenum was very much dilated to the end of its third curvature. Its calibre was nearly an inch in diameter; it terminated suddenly in a cul-de-sac, from which the remainder of the intestinal canal was continued, the calibre of which was extremely small. The serous membrane of the duodenum was continuous with that of the jejunum; but at the interior there was a complete obliteration, without any trace of constriction of the mucous membrane, which terminated like the crown of a hat. This intestine was distended with a large quantity of yellow, frothy liquid. It had not the pitchy consistence nor the green color of the meconium. The remainder of the intestinal canal, the calibre of which would not allow of the passage of a female catheter, did not contain any thing but a very small quantity of white mucus, adherent to the walls of the intestine. The large intestines, the size of which was a little more than natural, contained also but a small quantity of the same kind of mucus. There was found in them no trace of the meconium, and the mucous membrane was very white.

The two lungs were gorged with blood, particularly at their posterior border; the foetal openings were still unclosed; the brain was a little injected.

In these two cases we have seen that the children did not pass

any meconium; that they, at first, vomited the drinks given, afterwards yellow and frothy matters, which did not possess the proper characters of the meconium. Such are the most marked symptoms by which we will be enabled to recognise the existence of an obliteration of the small intestines. We ought to note particularly the absence of green matters in the remainder of the intestines; below the obliteration, the walls were only covered with the mucus which had been secreted. This circumstance proves to us that the green matters with which the large intestines are usually filled in young infants, are really, as I before observed, the product of the fœtal digestion, the aliments or materials of which are, without doubt, the waters of the amnios swallowed by the child, and the product of the pancreatic, biliary, and mucous secretions.

Dr. Schaefer remarks that the abnormal cases of division in the intestinal canal, reported by authors, may be classed under three heads—1st, The intestinal canal may be only constricted in several places; 2dly, It may be divided into several parts by the internal membranes; 3dly, It may be divided into several parts entirely separated, the one from the other.

All these malformations, whatever be the point where they exist, must be regarded as mortal, the child living at most but two days.

Among the malformations of the intestinal tube, ought to be arranged the diverticuli which are observed in it, and which are usually situated in the small intestines. They appear to be the result of the adhesions existing primarily between the intestines and the umbilical vesicle; they are rarely productive of any particular disturbance, and are no obstacle to the establishment of the digestive functions.

The inferior extremity of the intestinal tube sometimes presents a complete obliteration, which results from the imperforation of the skin at the anus, or the absence of the rectum to a greater or less extent.

The rectum then terminates in a cul-de-sac, and presents a pouch, terminating inferiorly by a circular corrugation of its membranes. It is not yet, in a young infant, much dilated, but it soon becomes more so, in proportion as the intestinal matters, the evacuation of which is impossible, accumulate in its cavity.

When one part of the rectum is deficient, the intestine terminates and adheres to the anterior part of the sacrum, to which it becomes more or less attached; if the whole of the rectum be absent, the extremity of the colon terminates near the sacro-vertebral angle by a cul-de-sac, which generally adheres to the superior extremity of the sacrum.

The imperforation or absence of the rectum does not always coexist with the imperforation of the anus. The orifice sometimes exists when the rectum is obliterated. This circumstance is the more serious, as the normal state of the anal orifice does not lead to the suspicion of the existence of the occlusion, thus leaving the accoucheur in a fatal security.

The study of the symptoms which result from the imperforation of the anus, may be here of some utility; it will enable us also to know the proper signs of ileus, or the symptoms of an interruption of the course of intestinal substances in a young infant.

CASE XXXIX.—*Congenital imperforation of the anus.*—Leblond, aged one day, of a robust constitution, entered the infirmary of the Hospice des Enfants Trouvés on the 10th of July. To the night of the eleventh, he had passed no meconium; yet the orifice of the anus appeared free; the abdomen had become swollen and very painful; the respiration was difficult; the extremities cold; the pulse small; the cries were without intermission. Towards evening, the child, after having thrown up a quantity of yellow mucus, vomited the meconium.

It was placed in a bath for half an hour without having any evacuation. The anal opening appeared to exist externally, and a catheter could be introduced to the depth of one inch, but then met with an insurmountable resistance. I caused a suppository of soap to be passed in the rectum, and let it remain half an hour without any evacuation. I then passed a bistoury, the point of which was directed by means of a grooved probe, in the direction of the sacrum; the edge of the instrument turned backward, and the back of it forward. The feeling that the resistance was overcome, indicated that the perforation had been made. I withdrew the instrument, the point of which was covered with meconium; a small quantity of blood flowed. An injection was then administered, which was soon returned, bringing with it some grumous blood. The child was again

placed in the bath, without experiencing any relief. The cry became more feeble; the abdomen swelled more and more; the respiration was quick and suffocating. Death took place about the middle of the night.

Post mortem examination.—Mouth and œsophagus healthy; the stomach contained some meconium; it was also found in the small intestines, which were distended with gas. The large intestines were considerably dilated by thick meconium; the dilatation commenced at the cæcum. The rectum terminated by a cul-de-sac, the extremity of which was corrugated; it adhered to the neck of the bladder, and did not descend to the anal orifice in the skin. The incision made in the cul-de-sac by the bistoury was found filled with a recently formed clot of blood, which seemed to have resulted from a hemorrhage from the hemorrhoidal arteries. All the organs of the abdomen were perfectly healthy.

The lungs were gorged with blood at their posterior border; the foetal openings were free; the sinuses of the cranium were filled with blood.

It is probable that the blood which flowed from the edges of the incision, immediately obliterated the artificial opening, thus obstructing the evacuation of the contents of the intestines. Perhaps this obstruction might have been overcome by the introduction of a gum elastic catheter, with the assistance of which tepid water might have been injected into the rectum to dilute the contents, and thus render their ejection more easy. In the case of an imperforate anus, an opening should be made as early as possible, for by delaying the operation it may not prove so successful, whatever may be, at first, the apparent good result.

CASE XL.—*Imperforation of the anus, enteritis.*—Grenel, aged two days, entered by the “Crèche” on the 9th of March. This child had passed no meconium since birth; the abdomen was tumefied and very painful, for the child cried, and the face became pinched whenever the abdomen was touched. The course of the colon could be felt through the parietes of the abdomen. He vomited green substances; the cry was feeble; skin cold; and the circulation very slow. The anus was imperforate, although there existed the appearance of its orifice at the perinæum. I passed through, a sharp-pointed bistoury, being careful to turn the back towards the bladder,

and after having made the incision, I enlarged it in a backward direction. A large quantity of meconium immediately issued from the opening; the swelling of the abdomen immediately subsided, and the pain apparently ceased, for the child stopped crying, and the face no longer exhibited the expression of pain. He was immersed for half an hour in a bath of marshmallows; but notwithstanding all these precautions, the vomiting continued, and he died at night.

On examining the body, a passive congestion of the pharynx was found, and on the mucous membrane of the stomach several patches of a vivid red, together with a universal redness and tumefaction of the inner membrane of the small intestines; the muciparous follicles were very numerous in the large intestines; the circumference of each of these follicles was surrounded by a red circle; the rectum was continued to the perinæum, where it was only closed by a single membrane. A large quantity of meconium was found in the large intestines. The remainder of the intestinal tube contained some yellow adhesive matters. The circulatory and cerebral systems were healthy.

It is evident that had it not been for the gastro-enteritis, this child would have been cured by the simple operation that was performed.

Instead of presenting a simple imperforation, as in the case just considered, the rectum is sometimes imperforate in consequence of a union with the surrounding parts, especially with the bladder. A very curious case of this unnatural union of the rectum with the bladder is found in *Commentationes societatis regię scientiarum Gottingensis, ad annum 1778*.

The rectum has been observed to open into the vagina,* and also into the bladder.† These deviations are less dangerous or less quickly fatal than a complete imperforation of the anus; but they are still of a very serious nature, as they condemn the individual to a disgusting infirmity.

When a child is born with an imperforate anus, the operation for the restoration of the passage must be performed immediately, and it ought to differ according to the point at which the obstruction is found to exist. Sabatier has given, in his treatise

* Journal de méd., chirurg. et pharm. t. 6, p. 128.

† Idem, t. 16, p. 107.

"de la médecine opératoire," some excellent precepts on this subject.

If the imperforation consist in a simple occlusion situated near the anus, which will be known by a general tension of the abdomen, and a feeling of fluctuation experienced at the rectum, which is distended with meconium, rendered more manifest during the crying of the child, several crucial incisions should be made with a pointed bistoury in the membrane obstructing the rectum; the borders of this incision will not reunite, in consequence of the continual passage of the fæces; if the opening be too narrow, it may be widened by a bistoury. Care should be used to prevent cutting the whole of the sphincter through, for Sabatier has seen, in an occurrence of this kind, where the discharges were involuntary from this cause: it occurred in an infant that died some months after the operation, from some other cause. When the imperforation is situated higher up, it is advised to pass a trocar, the canula of which is grooved for the direction of the bistoury, in the direction of the rectum. A straight bistoury may also be used, as was done by Petit in a case where the operation was followed by a successful result, and the matters flowed out freely during two months, the time that the child lived.*

If the rectum be deficient, of which we may be confident when we are unable to feel any signs of fluctuation in the perineum, it will then be necessary to make an artificial anus in the lower part of the abdomen. Littre advises an incision to be made in the integuments near one of the groins, and then to search for a portion of the intestine, and attach it by sutures to the incision, and thus establish an artificial anus. Duret has performed this operation with success in the left iliac region. The colon was adjusted to the lips of the wound by means of a waxed thread passed behind it, a longitudinal incision made, and an artificial anus was established on the seventh day after the operation, with which the child lived. I saw the same operation performed, but without success, at the Hospice de la Maternité at Angers, by M. Ouvrard, upon an infant in whom the rectum was deficient, and where the colon terminated in a cul-de-sac at

* Sabatier, loc. cit. p. 428.

the upper extremity of the sacrum.* Callisen has recommended that an incision be made in the lumbar region between the posterior border and the crest of the os ilium, parallel to the posterior border of quadratus muscle, in order to reach the colon in a point where it is in a measure outside of the peritoneal cavity. Whatever advantage there may apparently be in this method of operating, Sabatier gives the preference to that of Littre.

Congestions of the intestinal tube.—We have seen that, in a state of health, the intestinal tube of young infants is generally injected; that it almost always exhibits a rosy appearance, and that the digestive tube very often presents a number of vascular ramifications throughout its length. This evidently arises from the facility with which a reflux of blood takes place in the large intestinal vessels, and particularly in the venous system when any obstacle whatever is opposed to a free circulation of blood in the various branches of the vessels. This injection, which is so frequent and almost normal in the intestinal vessels of young infants, exhibits a great analogy to that which is seen in old men. In the latter, the circulatory apparatus has lost its vital activity, and the regularity of its functions, in consequence of the modifications or organic alterations in the principal agents of circulation. In young infants it has not as yet acquired this regularity, from an opposite cause, which is, that the organic modifications necessary to the accomplishment of the functions of the heart and lungs, have not yet begun, but which will take place in the course of time. But whatever be the difference of the cause, the effects are the same; and here, as in many other instances, we are able to make one of those approximations to the truth, which, holding united causes and effects, together constitute the assemblage of the phenomena of life, unveil to us their nature, and aid us in foreseeing their consequences. Let us see to what point these congenital congestions may exist, without injury to the digestive functions, and without requiring from us the assistance of our art.

The passive congestion of the digestive tube may appear in three different manners—ramified injection—capillary injection—and a redness spread over several parts of the digestive

* This case will be found in the *Précis de l'art des accouchemens* de M. Chevreuil, 2d edit. Paris, 1836.

tube, with or without sanguineous exhalation on its surface. The passive nature of these different degrees of injection may be recognised by the superabundance of venous blood in the abdominal veins, in the liver, and in the heart and lungs; this fluid has regurgitated in the intestinal veins, to their smallest ramifications.* This condition is very common in young infants, and particularly in those who, after a tedious birth, are in a state of asphyxia.

The ramified injection which exists in the intestinal tube of almost all new-born children, does not produce any functional disorder, but it is necessary to open the body to ascertain its existence; it is even possible that it may not occur until the moment of the death of the child, and that it may be the result of the slowness of the flow of blood at that time. As to the capillary injection and the local or general redness which is met with in different parts of the digestive tube in young infants, or in those a little advanced in age, they are the result of passive congestions which often give rise to a series of symptoms which the analysis of some facts enables us to appreciate.

I have examined with much care, twenty-five cases of passive congestion of the intestinal tube, without hemorrhage, in children who have died a few hours or a few days after their birth; fifteen of them exhibited all the characters of a state of apoplexy. The symptoms relating to the digestive apparatus, were nothing; those only were observed which related to the state of congestion of the lungs and heart; and the intestinal congestion, which was an effect of that of the respiratory apparatus, was not ascertained until the opening of the body.

Although this remark may appear to be of a negative character, still it is worthy of attention, for we ought to conclude from it, that whenever a child is born apoplectic, the digestive apparatus will also partake of the congestion of the circulatory organs, and both ought to be the objects of our attention.

If the passive congestion of the digestive tube does not give rise, during the first periods of life, to very severe symptoms, on account, doubtless, of the incomplete establishment of the func-

* For details upon the different aspect of passive redness, and that arising from inflammation, consult my work "*sur la membrane muqueuse gastro-intestinal*," p. 146.

tions of this apparatus, it is not the case afterwards ; for this passive congestion may become the direct cause of several consecutive consequences, which it is necessary to point out.

Intestinal hemorrhage.—Rather a frequent consequence of this general injection of the intestines, is intestinal hemorrhage, which, in the case we are now considering really deserves the name of passive hemorrhage. The analytical examination of some facts will, doubtless, contribute to elucidate this point of pathology.

I have examined fifteen cases of passive intestinal hemorrhage ; there were eight children aged from one to six days, four from six to eight, and three from ten to eighteen days. Six of these were males, and nine females. Most of them were remarkable for the plethoric condition of their bodies and the general congestion of their integuments. Some, on the contrary, were pale and feeble, as is common after abundant hemorrhage. In all, the large abdominal vessels, the liver, spleen, lungs, and heart, were considerably engorged with blood ; in nine, the fœtal openings were obliterated, or were nearly so ; in the remainder, they were still open. In all, there was a considerable injection of the meninges in the brain and spinal marrow ; and in all, the intestinal tube contained blood more or less red and more or less blackish, exuded and spread out in some of the convolutions, or accumulated in clots in various parts of the digestive tube. The detailed history of one or two of these cases will furnish us with the principal characters which distinguish the disease in general.

CASE XLI.—*Muguet, intestinal hemorrhage.*—Bathilde Fantase, a girl aged eleven days, entered the infirmary on the 30th of June. She possessed a medium strength, and the integuments were of a healthy color ; but she was affected with a copious diarrhœa of green discharges ; she also vomited her drinks. Her face occasionally became more pale ; the pulse was frequent and hard, beating from ninety-two to ninety-five pulsations ; some points of muguet appeared on the edges of the tongue. (*Gummed barley-water, sinapised pediluvium, demulcent electuary.*) On the 3d of July, the same symptoms continued, but the respiration had become more difficult ; the pulse was less frequent, but irregular ; the pulsations of the heart were very strong ; the cry was sometimes smothered. On

the fourth, a discharge of blood took place from the anus, the circumference of which was red and tumefied; there was a slight tension of the abdomen; rigidity and coldness of the limbs, and the respiratory movements were very painful. The face became pale, the cry feeble and smothered, and could scarcely be heard; pulse small and very slow; a universal sinking took place. (*Sweetened water, dry frictions, milk and water.*) Death occurred on the fifth. On examining the body, a slight layer of muguet was found on the tongue, and a well-marked injection of the œsophagus, together with a general capillary injection of the intestinal tube; the small intestines were covered throughout their whole length with a layer of blood of a bright vermilion color, about the commencement of the ileon, but of a much deeper color, resembling lees of wine, towards the ileo-cæcal region. The cæcum and colon, which were much injected, contained a large quantity of black coagulated blood. When a portion of the intestine, which was tinged with the blood, was macerated for a day in water, it lost, by degrees, its red color, and the injection in the vessels almost wholly disappeared. The *venæ cavæ* were filled with black fluid blood. The lungs engorged at their posterior border, were still crepitant at the anterior; the heart was filled with blood; the ductus arteriosus partially, and the foramen ovale entirely closed; the brain was very soft and much injected.

This child, doubtless, died from intestinal hemorrhage, which, insensibly becoming more abundant, was necessarily fatal.

When the hemorrhage is prolonged, if the blood, instead of being discharged, remains in the intestinal tube, it assumes a brown or black color, and the alvine evacuations exhibit a great resemblance to black vomitings with which new-born children are sometimes affected, and of which we have already spoken.

CASE XLII.—Marie Forbier, aged eighteen days, entered the infirmary on the 9th of March. She was small and thin; the abdomen was tender to the touch; and she was affected with the commencement of marasmus; tongue red at its edges; alvine evacuations green. (*Cataplasm to the abdomen, milk and water.*) From the ninth to the thirteenth, there appeared to be some melioration of the symptoms. On the thirteenth, the muguet, which had disappeared, again showed itself with increased intensity, and was spread over almost the whole of the tongue. On the eighteenth, the child passed by

stool a large quantity of black matters. She became extremely feeble; pulse slow and small; the cry could scarcely be heard. She died on the nineteenth.

Post mortem examination.—General paleness of the body; a layer of muguet upon the tongue; brown viscid matters in the stomach, where a large number of uninflamed mucous follicles were found; a general discoloration of the mucous membrane of the small intestines, to the surface of which, mucus streaked with blood, was found adhering, and a large quantity of brown matters resembling that which the child had discharged. The large intestines were in the same state. The liver was a little injected; the large abdominal vessels were distended with a quantity of black liquid blood; the lungs flabby, and but slightly crepitant; the heart was empty and remarkably relaxed; the fetal openings were obliterated, and the brain was in a healthy state.

I will not multiply the instances of this passive hemorrhage of the digestive tube, to which a great number of infants succumb; the other cases in my possession strikingly resemble those which I have already reported.

The first object we should have in view in the treatment of passive hemorrhage, is to relieve, at the same time, the congestion of the circulatory apparatus, and that of the intestinal tube; this is to be done by the application of one or two leeches to the anus. It would be advisable, also, to give the child cold drinks slightly acidulated, with the syrup of quinces, or some drops of nitric acid, or water of Rabel. It cannot be too strongly recommended to accoucheurs, to allow the umbilical cord to bleed when a child is observed to be in a state of asphyxia; for it has already been seen what serious effects follow from a superabundance of blood in young infants. Intestinal congestions and hemorrhages are not only serious in themselves, but they are also dangerous from the existing condition of the circulating organs, the important functions of which are impeded or suspended.

DISEASES OF THE INTESTINAL TUBE DEVELOPED AFTER BIRTH.

We have established a difference between the diseases of the stomach which consist in a disturbance of its functions without inflammation, and those in which there is inflammation with or without disturbance of function. The same observation is appli-

cable to the diseases of the intestinal canal, and we will begin by studying the causes and nature of diarrhœa without enteritis, as we considered vomiting and gastric indigestion without gastritis.

ART. 1.—Intestinal Indigestion.

There are a great number of sucking children affected with diarrhœa without enteritis; they become pale and sink into a state of marasmus, and upon examining the dead body no trace of inflammation will be found in the intestines. These children really perish from want of food; they die, it may be said, of hunger—the intestinal canal not digesting either the milk that is sucked, or that which is given to drink. Let us, in the first place, examine what are the external signs of this intestinal indigestion, and afterwards seek for its cause.

These signs are—progressive emaciation, paleness of the face, continual hunger of the child, who seizes the breast with extraordinary eagerness. The diarrhœa, which consists of white mucous matters, is sometimes so fluid as to soak into the clothes and stain them, like the fluid which flows from the vagina in leucorrhœa. With these mucous matters there are often mixed lumps of coagulated milk, which has passed unaltered through the intestinal canal. After a certain time, the child perishes in the last stage of marasmus, and if the intestinal tube is opened, the mucous membrane is found without color through its whole extent, and is often softened; but, in this case, it has undergone an alteration of tissue, the nature of which will be examined in another place. Sometimes the digestive tube is inflamed, ulcerated, and disorganized, to a greater or less extent; but the white softening is the lesion most frequently met with in children that have died from the disease now under consideration. In the year 1826, I examined, after death, fifteen cases of chronic diarrhœa without inflammation, in children from the age of fifteen days to two months. In eight of them, I discovered no lesion; there existed nothing but a general discoloration of the integuments and of the intestinal tube, while all the organs were exsanguined. During life, these children experienced an incessant vomiting and diarrhœa; in almost every one, the abdomen appeared to be distended with gas, which was found in

great abundance, together with white, frothy fluid matters, upon examining the intestinal tube. In two others, the colon contained some green flocculi, analogous to the meconium in color and consistence. In five others, there were different lesions of the lungs or of the brain, and the intestinal tube exhibited the characters which I have just described.

This discoloration of the mucous membrane is almost always the first degree of a species of softening, which must not be confounded with inflammation. I will also remark that the intestinal tube, in place of being without color through its whole extent, sometimes exhibits at various parts red patches or streaks, which are the last traces of a normal coloring, or of the congestion so frequent in this part in a young infant. I shall return to the consideration of this subject when speaking of the softening of this membrane. This alteration of the tissue is, I believe, one of the effects of a defective nutrition, for the consequences which result from this aberration of the digestive functions, are not confined to a simple marasmus, such as have been described, but other lesions happen, and which will be examined in another place. I will content myself, for the present, with referring to those cases where the functions of the intestinal tube are perverted without any appreciable lesion of an inflammatory nature.

Every thing connected with this subject leads to the belief, that this defect of nutrition consists in the nature of the food, or, perhaps, in the mode of suckling to which the infant is subjected. In truth, all the children at the Hospice des Enfants Trouvés, and who are confided to the care of the wet-nurses, are pale, thin, and in a bad condition. A great number perish in this hospital from imperfect nutrition; in almost all, the symptoms which they present, even to the time of their death, arise from an evident disturbance of the digestive functions, whether the organs discharging this function are inflamed, or whether they have arrived at the stage of debility, discoloration, and wasting, of which I have spoken. In all probability this wasting arises from the suckling of the children by women who have for a long time discharged the office of nurse, and who by changing the child frequently, feel a perfect indifference for the one placed under their care, and establish no regular hours for suckling, nor fix upon the quantity of milk necessary for the child; so

that, always hungry from receiving but little substantial nourishment, it takes too large a quantity at a time of a liquid which, from its superabundance and bad quality, is rendered doubly hurtful.

This is the proper occasion to speak of the interesting researches of M. Payen, the distinguished chymist, who has made several experiments upon the nourishment of young infants.*

M. Payen observes, that during the period of suckling, great disturbances in the digestive organs frequently either proceed, accompany, or follow a forced alteration in the alimentation; and also the milk that appears suitable for one child may be highly deleterious to another of the same age. There has been no more success in substituting the milk of the goat for that of a female. This is what M. Payen has demonstrated in comparing the physical characters of several kinds of milk which had produced different effects on the same infant, or the same effects on different individuals.

(*Experiment No. 1.*) The milk of a goat, which was permitted to run at liberty in the fields during the day, and which was fed at the stable with dry food, was found white, opaque, without any defined odor, and of a density equal to 3 degrees 75 centièmes (Baumé,) having no sensible action on the tincture of turnsole. Fifty grammes of this milk, treated by a chymical process which is too long to be reported here, gave the following results:—

Water, with some traces of acetic acid,	42.75
Fatty matter, (butter,)	2.04
Caseum, and traces of insoluble salts,	2.26
Sugar, soluble salts, and some traces of azotic matter,	2.93
Total,	49.98

This is about equal to 14.5 of solid matter for every 100 parts of milk.

(*Experiment No. 2.*) The milk of a female seven months after her confinement, in a healthy condition and of a good constitution, suckling but from one breast. She had submitted, as did also the others which are mentioned below, to the regimen most suitable for nurses, as advised by physicians.

* *Journal de Chimie Médicale, de Pharmacie et de Toxicologie*, recorded by the members of the Société de Chimie Médicale, March, 1828, p. 118.

Physical properties.—White, opaque, of the density represented by 3° 5 of Baumé's ærometer, very sensibly alkaline upon the application of the proper test; which alkaline quality continued during the entire evaporation.

Chymical properties.—Fifty grammes of this milk gave the following results:—

Water,	.	.	.	.	43.00
Fatty matter,	.	.	.	.	2.58
Caseum, and traces of insoluble salts,	.	.	.	.	0.09
Sugar, soluble salts, and traces of azotic matter,	.	.	.	.	3.81
Total,					49.48

Equivalent to about 13 parts of solid matter to every 100 of milk.
(*Experiment No. 3.*) Milk of a healthy female eighteen months after her confinement.

Physical properties.—Opake, white, alkaline, indicating 3° 6 of Baumé's ærometer.

Chymical properties.—Fifty grammes were composed of—

Water,	.	.	.	.	42.80
Fatty matter,	.	.	.	.	2.60
Caseum, etc.	.	.	.	.	0.125
Sugar, soluble salts, etc.	.	.	.	.	3.965
Total,					49.490

About 13.4 solid matter for every 100 of milk.

(*Experiment No. 4.*) Milk of a female in good health, of a larger size and more corpulent than the preceding, four months after her confinement. This milk indicated 3° 55 of Baumé's ærometer, and yielded the same as the others, in the following proportions, in the fifty grammes submitted to the experiment:—

Water,	.	.	.	.	42.90
Fatty matter,	.	.	.	.	2.59
Caseum, etc.	.	.	.	.	0.12
Sugar, salt, etc.	.	.	.	.	8.93
Total,					54.54

About 13.8 solid matter in 100 parts of milk.

Several other specimens of milk, taken from females from four to twenty months after confinement, gave the like results as those in experiments Nos. 3, 4, and 5.

From this it appears that the milk of the female differs from that of the goat principally in its marked alkaline quality, and in its containing about half the quantity of caseum.

As to the milk of the females, under the circumstances just mentioned, it differs in respect to its composition. That in experiment No. 2, contained one third less of caseum, and I also observed that this milk always issued in a much larger quantity from the breast. The children under the care of each of those females were in good condition.

These data are certainly of the greatest interest, and they become still more important, when we apply them to the regimen of sucking infants. Let us therefore examine still further the dissertation of M. Payen, and quote his remarks at length at the end of his paper.

“A child aged seven months and a half, healthy at the time of birth, although it had evidently suffered a little from too slender nourishment during the first months, in consequence of the accidental diminution of the milk of several nurses in whose charge it had been successively placed, was fed for ten days with the spoon, with thin oatmeal water mixed with a tenth part of goat's milk, taken four times during the day and twice at night, rather less than a quart in twenty-four hours containing—

Solid substances of milk,	.	.	14 grammes
Dry extract of the oatmeal,	.	.	16
			—
Total,			30

During this time the infant thrived, but a nurse better than the former was sought for; and one was at last chosen who appeared to have abundance of milk, and possessed a healthy look. This was the female whose milk was made the subject of the experiment No. 2. The child sucked greedily, and the milk flowed abundantly; but, from the third time of nursing, the stomach was overloaded, the mouth remained open, and the child ceased to smile in its usual manner. During the night the sleep was much disturbed. The physician then advised that the child should be kept at the breast but three minutes at a time.

"The untoward symptoms returned with increasing intensity, repeated vomitings took place, and one of them was followed by syncope.

"I determined to make an experiment with this milk; and in the first place I measured the quantity taken by the child in five or six times in twenty-four hours. I ascertained it to be more than eleven decilitres. Having also discovered the proportion of the solid matter it contained, I found that this measure represented 160 grammes, that is to say, five times more than the milk of the goat diluted with oatmeal water. In addition to this, the flow of milk was so easy, that the child sucked this quantity in less than ten minutes.

"I informed the physician of these facts, and of the quantity of butter which I found in the milk of this female; he immediately decided to stop the suckling, and to substitute milk and water; the unfavorable symptoms disappeared in a few days, sleep and liveliness returned, while the strength of the nourishment was gradually increased to a third of the proportion of milk."

I have reported this fact in detail, because it suggests to us the precautions necessary to be taken in managing the suckling of children. When a child appears feeble and pale, and does not digest the milk of its nurse, it is well to attempt the feeding it with the spoon or bottle, to regulate the quantity, and to correct the quality, by diluting it with barley-water. I have often seen at the *Hospice des Enfants Trouvés*, goats' milk diluted with barley-water, perfectly digested by those children who rejected the milk of their nurses, and who had wasted away daily from defect of alimentation.

However much we may be gratified with the feeling, so eloquently expressed by one of our most beautiful writers, that is produced in contemplating as a law of nature, the suckling of the infant by the mother, and which it is believed to be a duty implicitly to obey, we may nevertheless find some exceptions; and where the mother may be obliged to renounce this most noble of duties. We should not forget that our social state often removes us far from the state of nature, and that there exist circumstances where it would be absurd to force a mother to nurse a feeble infant, for the sole reason that it is the order of nature

that an infant should only live on the milk of a woman during the first months of its life. I repeat it, that suckling by the mother ought not to be considered so generally and exclusively necessary as to be deemed the only means suitable for nourishing feeble infants. Every mode of alimentation should be tried, and that adopted which is found best for the digestive apparatus of each infant. I would again recommend, in such cases, to use the different varieties of food which have been already mentioned, when treating of gastric indigestion.

ART. 2.—Invagination of the Intestines.

Intestinal invagination is of very frequent occurrence in sucking infants; it may not show itself by any symptom, for I have often found it, on a post mortem examination, in children who, during life, were affected with nothing more than constipation, and who appeared not to have had any abdominal pains; yet it is very possible that obstinate constipation, considerable tension of the abdomen, excessive pain, and even death itself may follow intestinal invagination, particularly if the mucous membrane of the invaginated portion become inflamed; and then it may be considered as one of the most serious affections of early infancy. Obstinate constipation, progressive tumefaction of the abdomen, vomiting of drinks, and afterwards of intestinal and sterco-raceous matters, in a word, the symptoms which we have pointed out when treating of imperforation of the rectum, show themselves in intestinal invagination, when complicated with a complete interruption of the passage of the contents in the digestive tube. This condition is very difficult to remedy; yet we should attempt to establish the functions of the digestive tube by the use of baths, by abstinence from the breast, laxative enemata, gentle compression of the abdomen, and lastly, by the administration of a dessert spoonful of olive oil.

A complete interruption to the passage of intestinal matters, together with its consequences, may arise from other causes; the consideration of which we will hereafter make the subject of our inquiries.

Is the intestinal tube of young infants susceptible of becoming the seat of nervous colic, such as *ileus*, *miserere*, etc.? And is

the excessive pain in the bowels of young infants, which is increased on pressure, and known by their restlessness and obstinate cries, always simply nervous, and not the effect of inflammation of some of the abdominal organs? I do not think so. I believe that the violent colics to which children are exposed, are as often owing to well-marked anatomical lesions, as to a simple morbid exaltation of sensibility; it is indeed what we shall demonstrate in the course of these researches.

Whichever it may be, if a physician be called to a young infant suffering from violent abdominal pains; if they are accompanied with constipation, vomitings, and even convulsions; if they are remarkable for their alternate remissions and exacerbations, and have not been preceded or accompanied by symptoms of enteritis, the existence of a nervous affection of the digestive tube may be then suspected, and antispasmodics, such as a little ether diluted with water, or syrup of poppies mixed with sweetened water, may be administered. But we should use these means with great caution, and not forget that nervous affections of the digestive tube are much more rare than inflammations in young infants.*

ART. 3.—Inflammations of the Digestive Tube.

The intestinal mucous membrane may become, like that of the stomach, the seat of different varieties of inflammation. We shall then consider in succession, erythematic, follicular, and gangrenous enteritis. Enteritis with altered secretion, or muguet of the intestines, is very rare; yet it may occur, and we shall give one example of it.

We will commence on the subject of inflammation of the intestines developed before birth, arriving afterwards at the examination of enteritis occurring in infants after this period.

§ I. INTESTINAL INFLAMMATION DURING INTRA-UTERINE LIFE.—The state of congestion of the intestines, even before birth, necessarily exposes these organs to inflame during intra-uterine life. The observers of this condition have given us several examples, but their descriptions are sometimes of so dubious a nature, that we can scarcely put any confidence in them; yet we

* See Appendix.

may refer to a very curious case, described by Professor Desormeaux, in his article *Pathologie de l'œuf*, in the *Dictionnaire de Médecine*, in 21 volumes. I had charge of an infant, says he, some years since, born of a mother who had enjoyed excellent health during her pregnancy. This child, when born, was extremely emaciated; the surface of the body was of a yellowish white, with an expression of face like that of an old person suffering with pain. The abdomen of this little patient was swelled, hard, and painful; the convolutions of the intestines were easily discovered beneath the integuments; all the symptoms announced the existence of enteritis of long standing. It was placed under the care of a good nurse, and notwithstanding its extreme feebleness, it was able at first to receive a few drops of milk, and afterwards to suck, and subsequently became a fine and healthy child.

As the anatomical examination of this case did not occur for its more complete elucidation, I will add others which I have seen, and where the post mortem examination of the disease removes all doubts as to its nature.

CASE XLIII.—*Enteritis, excrescence or vegetation on the surface of the duodenum.*—Blanchard, a boy, was brought to the Hospice des Enfants Trouvés on the 11th of December, 1826. This child was pale, thin, and very small; he remained for six days under the care of the wet-nurses, but instead of increasing in strength, he became rapidly more emaciated, with an incessant diarrhœa, together with vomiting. He entered the infirmary on the seventeenth; we had hardly an opportunity of examining the case, for he died at night. The post mortem examination was made on the succeeding day. I found the stomach slightly injected, and spotted with red; some red transverse striæ existed in the duodenum; a red, irregularly shaped excrescence, resembling a strawberry, was found about the middle of the second portion of this intestine. It was about the size of a French bean, and was firmly attached by a pedicle to the surface of the mucous membrane upon which it was developed; it resembled in every respect the excrescences which are sometimes formed on the surface of this membrane in adults, cases of which I have reported. Its structure was spongy, but not erectile; it was easily crushed between the fingers, and the blood which it contained was readily squeezed out. Besides this organic alteration, there existed at the termination of the ileon a chronic inflammation, characterized by a

thickening of the mucous membrane, which was of a strongly marked slate-color; striæ of the same color existed in the colon. There was nothing remarkable in any of the other organs.

This vegetation of the duodenum can hardly be attributed to chronic inflammation, and it is very difficult to explain the nature and cause of these kinds of excrescences, which, without doubt, have some analogy to warts on the skin. But the slate-colored appearance of the ileon, which was at the same time tumefied, must be regarded as an incontestable evidence of chronic inflammation; it is to this phlegmasia, with which the infant was born, that the languor, rapid emaciation, and death must be attributed.

CASE XLIV.—*Chronic colitis, sclerosis of the colon.*—Joseph Camison, aged six days, entered the infirmary on the 22d of September. He exhibited a slight icterous tint, was affected with an abundant diarrhœa, and was in a very advanced state of marasmus. Since his birth, emaciation had steadily increased; the face very much altered, continually expressed the presence of great pain; a number of wrinkles were formed on the forehead, and the commissure of the lips was drawn backward; he cried but little, and remained immoveable in his cradle. He died the same night that he entered the infirmary. There were found, on a post mortem examination, a passive congestion of the œsophagus, and a spotted redness of the stomach; the duodenum and the jejunum presented nothing more than a slight injection; but towards the extremity of the ileon a thickening of the walls of the intestines commenced, which increased more and more towards the cæcum; the ileo-cæcal opening was much contracted, and its valve more red, hard, and tumefied. This thickening was more particularly in the sub-mucous cellular layer; the mucous membrane was also a little thickened, very red, and quite tender. The peritoneal membrane was as thin as in the natural state; so that the cellular membrane, considered by itself, formed a membrane of half a line in thickness, very solid, and in color resembling pearl; its tissue, which retained no longer its cellular form, was, on the contrary, homogeneous, and, when cut, left a smooth surface. This lesion presented the anatomical characters assigned by Laënnec to sclerosis. It existed in the entire length of the colon.

The intestinal matters were yellow, liquid, and but slightly adherent to the parietes of the intestines.

The liver was black and gorged with blood; the bile abundant, viscid, and of a deep black. The lungs and brain were healthy.

This lesion was without doubt developed during the intra-uterine life, and the child brought with it the chronic colitis of which we have spoken; and to this affection must be referred the state of feebleness, diarrhœa, and the rapid emaciation of the patient immediately after birth. These two cases of congenital enteritis, may throw some light on the state of feebleness in which some infants are born, and where life is scarcely established, and who are affected with lesions, the premature development of which produce an important change in the young embryo. This should also prove to us the necessity of examining, with the greatest attention, the nature of the causes to which is attributed the *feebleness of birth*.

I could also give several examples of congenital lesions of the digestive tube, but the recital of their history would occupy too much space; I will simply state that I have observed ten cases of congenital enteritis in infants that have died on the first or second day after birth. In three of them there was an evident inflammation of the follicular plexus of the ileo-cæcal region. In others, there existed a number of white follicles, slightly projecting, in the cæcum, surrounded by a red circle; ulceration had commenced on the summits of some of these follicles. In five others, the inflammation only consisted in red patches, with tumefaction and friability of the mucous membrane of the small intestines. The most remarkable thing in these cases was, that the meconium exhibited no sensible alteration, but possessed its ordinary consistence and aspect; the children, however, were almost all pale and thin. Yet one of them, where the follicular apparatus was inflamed, was strong and vigorous.

The symptoms of congenital enteritis are analogous to those of enteritis which is developed after birth.

§ II. INFLAMMATIONS OF THE INTESTINAL TUBE DEVELOPED AFTER BIRTH.—Inflammation of the mucous membrane of the intestinal tube ought particularly to be noted with reference to the varieties of its seat; but before studying it in this

respect, let us examine the general lesions arising from the phlegmasiæ of the interior of the digestive tube of young infants.

Inflammation of the intestines may exhibit the same anatomical varieties as those of the stomach; we shall therefore make the following divisions of phlegmasia of the bowels.

ENTERITIS,

Erythématic,

With altered secretion;

Follicular,

With disorganization of tissue.

Erythematic enteritis.—There is a very trifling difference between erythematic inflammation of the intestines and the passive injection of which they are often the seat in young infants, and it is very difficult to establish the line of demarcation between these two lesions. We can, however, say that the one is sometimes the predisposing cause of the other, and that if the intestinal tube is so frequently inflamed in young infants, it is because it is almost always injected. The blood which constitutes this passive injection becomes, by its prolonged retention in the vessels or in the tissue of the membrane, an irritating, foreign body, which may produce lesions and symptoms peculiar to recent inflammation.

When, in place of a simple ramiform capillary injection, the erythematic inflammation exhibits, as its anatomical characters, patches of redness of greater or less extent, indifferently situated either in a dependent or other part of the digestive tube, accompanied by a tumefaction and friability of the mucous membrane more or less evident—the lesion is then evidently inflammatory, and is often the result of a true passive congestion. To obtain an exact knowledge of the existence of erythematic enteritis, I have particularly remarked the symptoms which appeared during the life of those children that showed the anatomical lesions, the characters of which I have just described. The following is the result of this analytical examination.

I have seen a great many cases of erythematic enteritis, but many of them were accompanied with gastritis, pneumonia, etc.,

and if they were accumulated here it would be extremely difficult to separate and group the symptoms belonging exclusively to this disease. When the number of complicated cases was separated from those which existed without complication, the latter is reduced to forty. They were of different ages, from one day to one year. In thirty, there existed a diarrhœa of yellow, liquid matters; in six, vomiting of drinks; in twenty-five, distention of the abdomen; in four, natural stools; in six, there was no diarrhœa; in five, an erythematic redness about the anus, caused, without doubt, by the contact of intestinal matters; in neither of them was there abundant transpiration; in almost all, the skin was dry and burning; and in four only did there exist a febrile acceleration of pulse, and those four were aged from five months to one year. In twenty-five, the face possessed the peculiar expression of pain, characterized particularly by vertical wrinkles at the root of the nose, and by the drawing outward of the commissure of the lips.

Erythematic enteritis is often complicated with hemorrhage. In four of these children where there existed a violent inflammation, blood was found exhaled in different parts of the intestinal tube. One of them had passed a considerable quantity both by vomiting and stool. We have already seen this symptom exist in cases of passive abdominal congestion; but the hemorrhage now under consideration, is not the result of a superabundance of blood in the intestinal vessels and in the large vascular trunks of the abdomen, but is evidently a sanguineous exhalation resulting from the afflux of blood by the stimulus of the inflammation in the mucous membrane. The following is an interesting case of this kind.

CASE XLV.—Marie Colin, aged ten days, small, but of good strength, entered the infirmary on the 27th of September. Her cry was well sustained and complete; integuments were of a vermilion color. She was then in the ninth day of the vaccine disease, which had passed regularly through its stages. She cried incessantly; several points of muguet appeared on the borders of the tongue, the membrane of which was of a cherry red; she had a copious diarrhœa, but the abdomen was not tense. (*Gummed rice-water, emollient gargle, starch injections, milk and water.*) On the twenty-eighth,

the same condition ; the child slept none ; cried night and day ; was in a constant state of restlessness ; the face continually pinched, expressed pain ; diarrhœa abundant, and mixed with a considerable quantity of blood ; yet she did not become much emaciated. The skin was hot and dry, and the pulse beat about sixty-six in a minute. On the 1st of October, the muguet extended to the internal surface of the lips and cheeks ; the child was very restless, and vomited the drinks for the first time ; there were several streaks of blood in the matters vomited. (*Sweetened tilia, warm bath, milk and water.*) The same general state continued for several days. On the fourth, the expression of the face was much altered ; the abdomen became distended, and when compression was made, wrinkles were observed in every part of the forehead ; the muguet formed a thick layer on every part of the tongue, and extended to the lateral part of the frœnum ; the cry was feeble and exhausted ; alvine dejections green, bloody, and very abundant ; abdomen hard and tense to the touch ; thorax resonant in all parts. Death took place at night, and the post mortem examination was made the next day.

The body still retained much of its embonpoint ; the limbs were inflexible ; adipose matter was thickened in different parts of the body ; a thick layer of muguet existed above and below the tongue, and the inferior extremity of the œsophagus was the seat of a well-characterized gelatinous softening. On the internal surface of the stomach there was only found a spotted redness ; there existed throughout the whole extent of the digestive tube a large quantity of bloody matter of the consistence of pitch. In different parts of the small intestines there were several red patches, accompanied with a well-marked tumefaction, and a great friability of the mucous tissue, which was torn with the nail with the greatest ease. There was found besides, some blood which had been recently effused at these inflamed parts. Several follicular patches, red and tumefied, were discovered at the extremity of the ileon. The cœcum was studded with a number of separate follicles slightly inflamed, and there existed in the colon a number of red patches, mixed with slate-colored streaks.

The liver was not much more colored than natural ; the gall bladder contained liquid bile of a deep green. The lungs were healthy ; the right lung only was found a little engorged with blood at its base ; the ductus arteriosus was still open, and the foramen ovale closed. The brain was firm, and much injected.

The disease of which this child died, was evidently concen-

trated in the intestinal tube, and the symptoms produced by it are remarkable for their severe and positive character ; a copious green-colored diarrhœa, painful expression of the face, continually increasing tension of the abdomen, ceaseless motion, caused, without doubt, by pain, and in the midst of all this excitement, without any febrile action, are the symptoms which are at first presented to our notice. Soon after, vomiting supervened, and the examination of the body leads to the belief that this was owing to a softening of the œsophagus, which took place towards the termination of the disease. Finally, the appearance of blood in the vomitings and injections, are sufficient evidence of the existence of intestinal hemorrhage. The traces of it were found upon examining the body ; and in analyzing the symptoms exhibited by this child, we are able to appreciate their value, and can thus decide on the existence of enteritis, complicated with hemorrhage.

Erythematic enteritis, wherever its seat may be, may precede different varieties of inflammation, of which indeed it is the first stage, and assume various aspects while it continues. The intense redness which is peculiar to this inflammation, is followed by a brown or slate color, diffused in patches, striæ, or points, in various parts of the digestive tube ; so that it is very common to find in infants dying after a prolonged diarrhœa, and by which they are reduced to a state of complete marasmus, several slate-colored striæ, either in the small intestines or in the colon ; and this alteration of color in the mucous membrane ought to be regarded as an indication of chronic phlegmasia.

I must add, that enteritis does not always show itself in a manner so strongly marked as in the case just mentioned ; but the disease may be recognised, although the symptoms be not quite so clear, by comparison with those in the case which I have chosen as a type.

This disease is often complicated with gastritis. Gastro-enteritis is really a disease of common occurrence in sucking infants. The symptoms of this complication do not differ much from those belonging to simple enteritis ; vomiting of greater or less obstinacy exists, but it is very common to see children vomit who are only affected with enteritis ; the presence of this symptom, therefore, will not enlighten us as to the union of gastritis with

enteritis. One of the most probable signs of the existence of these two diseases simultaneously, is pain in the epigastric region, indicated by a painful expression of the face, and by the cries of the child when compression is made on this region. But may not this be a very vague indication? and may not the inflamed colon, which is near the place of pressure, actually be the seat of the pain which is referred to the stomach? Thus, then, if pathological anatomy demonstrate to us that enteritis is often accompanied by gastritis, clinical observation on the diseases of young infants, is not sufficient to enable us to distinguish gastro-enteritis from enteritis alone. What I have observed with respect to the inflammation now under consideration, may be applied to other phlegmasiæ. In all cases, however, the impossibility of making this distinction is of little consequence in a therapeutic point of view, since the treatment of enteritis is perfectly applicable to gastro-enteritis.

Enteritis, with altered secretion, or muguet of the intestines.—The alteration of the secretion which constitutes muguet, may be met with on the surface of the mucous membrane of the intestines during its inflammation. I have met with one instance of this altered secretion on the surface of the ileon; but as I did not record the symptoms which appeared during the life of the child, I will not report the anatomical investigation. I will here give the history of a case of muguet of the colon.

CASE XLVI.—*Partial softening of the stomach, muguet of the colon.*—Louis Simonet, aged three days, entered the infirmary on the 21st of April, for a severe diarrhœa, with which he had been affected about two days. He exhibited besides, a slight icterous tint over the whole body. (*Sweetened rice-water, milk and water.*) On the twenty-fifth, the icterous disappeared, and the child vomited the drinks; the diarrhœa continued abundant, and produced a rapid emaciation. Death occurred on the twenty-seventh. On opening the body, the buccal membrane was found healthy; there was a complete disorganization of all the coats of the stomach, the mucous membrane of which exhibited a gelatinous softening, particularly about the great tuberosity. The inferior third of the ileon, the cæcum, and the colon, were red, tumefied, and rough, and exhibited on their surfaces a great number of flakes, floating in the midst of fœcal

matter, of the consistence of cream, liquid, and of a green color; but the greatest number were firmly adherent to the membrane, and could not be separated without scratching them with the scalpel. This appearance did not exist in the sigmoid flexure of the colon; but it was found in the rectum, in which were several deep red, longitudinal striæ. The remainder of the body exhibited nothing remarkable.

It is impossible not to admit that this altered secretion bears a resemblance to that which, in the mouth and stomach, has been called muguet. If this altered secretion be analogous to the false membranes which are developed on the surface of mucous membranes generally, we must not be surprised to see it developed in the colon, since inflammation of this membrane sometimes produces membranous pellicles, spread to a greater or less extent over different parts of its surface, as is seen in dysentery and other intestinal phlegmasiæ. There exists no symptom peculiar to muguet, by which a correct diagnosis can be made of it in the intestines. The case reported presented nothing more than the symptoms of enteritis, and it has been recorded as an instance of the variety of inflammation which we have designated as enteritis with altered secretion. Perhaps we might find false membranes in the colon of infants; but I have never seen them.

Follicular enteritis.—The follicular apparatus of the intestinal tube may become, like that of the stomach, the seat of various alterations. It consists, as is well known, of small isolated glands in the upper two thirds of the small intestines, grouped in oblong plexuses, almost always occupying the free borders of the intestines, and varying greatly in number. They again appear, isolated, in the cæcum and colon, and occur even in the rectum.

In their natural state they are more or less apparent; many children do not show them at all, and their development varies according to the individual.

The changes in the muciparous follicles of the intestinal tube are not all of an inflammatory character. They experience, for example, at the period of dentition, an increase of vital energy, which augments their secretion considerably, and renders their size larger, and their number greater, but which still does not produce any redness, tumefaction, or ulceration, as is observed in

ordinary inflammation. It is important for us to stop and consider this species of organic and functional excitability which occurs in the follicular apparatus of infants at the breast.

I have seen isolated follicles and follicular plexuses of the intestinal tube, in considerable numbers, and developed without being inflamed, in twelve infants. There were three, aged from eight days to three weeks; two aged two months; the remaining seven, were from nine months to one year. The follicles appeared at the commencement of dentition. Ten of these children were affected with diarrhœa of liquid, white mucous matters. This is really the serous diarrhœa of authors; and every symptom leads to the belief that there is a direct relation between the development of these follicles and the augmentation of their secretion. Most of these children had arrived at the period of dentition, so that there appeared a remarkable coincidence between the period of the appearance of the teeth and that of the organic development of the follicular apparatus of the intestines. A physiological explanation may be given of this coincidence. In fact, the follicular apparatus appears destined to second the action of the intestines in digestion, by furnishing the surface of these organs with a fluid, which, in all probability, assists in the elaboration of aliments. Dogs, and other carnivorous animals, where the digestive power, if I may use the expression, is truly remarkable, possess this apparatus in a high degree of development. We ought not to be surprised to find the follicles, or the muciparous plexuses, augment in volume and activity at the period of dentition in man, since the organs of digestion then receive a modification which renders them fit to fulfil their functions.

It appears then, that nature has fixed the same period for the development of all parts of the digestive apparatus, for at the same time the salivary glands acquire a much larger size, and secrete saliva in greater abundance.

This coincidence in the normal development of the teeth, and in the increase of size and activity of the follicles, explains the relation that exists between dentition and the frequency of the serous discharges from the bowels, at this period, in infants; in this manner, then, can be explained the sympathy pointed out by authors between the appearance of the first teeth and affections of the bowels, without having recourse to those hypotheses

too often referred to in researches on the phenomena of life. There is here a remarkable coincidence—or if the expression be thought better, a morbid functional sympathy, because there is a coincidence of development.

Although children do not exhibit the development of the muciparous follicles before dentition so often as after this period, it must not, on this account, be thought that these follicles do not exist at birth. They have been very often found in considerable numbers from the first moment of life; but generally speaking, they are not very numerously developed in the intestinal canal, except at the period above mentioned, and sometimes even not until a more advanced age.

I do not consider this morbid development of the muciparous follicles, as a true inflammation. Nevertheless, this state of excitability which causes the augmentation of their secretion, is, as it were, an intermediate stage between the normal state and the state of inflammation; and it would be proper to keep the child affected with this diarrhœa, to a strict regimen. We may satisfy ourselves whether it is owing to the morbid state I have described, by examining the nature of the discharges. The child ought then to be fed on milk and water or barley-water. The diarrhœa which supervenes in such cases is so abundant and so debilitating, that in a few days the child is reduced to complete marasmus. The follicular development may not be confined solely to the intestines; but it may also occur in the whole length of the digestive tube, as will be seen by the following case.

CASE XLVII.—Charles Marand, aged six months, entered the infirmary on the 8th of March. He had, for some days, been affected with a diarrhœa, at first of yellow matters, afterwards white and frothy; he was pale, thin, and extremely feeble; a great number of small projecting points were seen in the mouth; the tongue was dry, without being red; the limbs were cold; there was nothing remarkable in the pulse. (*Sweetened rice-water, milk and water.*) On the ninth, the diarrhœa continued; the abdomen was slightly tumefied; the child cried but little; yet the face was pinched, and presented the appearance of *facies hippocratica*. A tumefaction was observed on the lower gum, produced by the first incisors, which were ready to appear; an abundant saliva flowed from the mouth, and every thing

seemed to indicate that the child was suffering from dentition. He died on the night of the eighth.

Post mortem examination.—The body exhibited a great degree of emaciation; the mouth, œsophagus, and stomach presented a great number of small, white, slightly projecting follicles. The mucous membrane of the small intestines was pale and studded with numerous follicles, and fourteen well-marked uninflamed follicular plexuses were discovered in the lower two thirds of the ileon. There were but few in the cæcum; the colon was pale, like the small intestines; the lungs and brain were healthy.

Although the follicular apparatus was very much developed, it certainly was not inflamed in the subject of this case. The diarrhœa and the marasmus which were observed, were owing to an abundant secretion from the intestinal tube.

This disease is the more serious in proportion as it is complicated with encephalitis, or aphthous or follicular stomatitis, as is often observed in dentition. Children perish then in a very short time, and the abundant discharges ought to be arrested; and the affection not being accompanied with inflammation, as we have just seen, may be advantageously treated by using slightly astringent drinks. I am not able to designate precisely the mode of treatment which it is necessary to pursue, because experience has not enabled me either to test any, or to observe that of others.

The follicular apparatus may become, in some instances, the seat of evident inflammation, such as is met with in adults. M. Denis was one of the first to describe this affection in young infants; and having myself often had opportunities of studying the disease at the Hospice des Enfants Trouvés, I am satisfied with the correctness of M. Denis's description.

When the isolated follicles or the follicular plexuses of the intestinal tube become inflamed, they may exhibit two species of alteration. They are either simply red and tumefied, or disorganized, forming ulcers remarkable both for their form and appearance. I will not stop to follow them in their various periods of development, tumefaction, and ulceration, but will refer to another work, in which I have given the details in full,

and confine myself here to the examination of the difference between the disease as it appears in children and in adults.

It is well known that inflammation of the follicular apparatus in adults, gives rise to symptoms analogous to those which are assigned to putrid and adynamic fevers. This has been demonstrated by the researches of MM. Petit and Serres, and in the more recent work of M. Bretonneau. What I have published on the same subject, goes equally to the support of this opinion. But it is not in every respect the same in young infants, for in twenty cases of inflammation of the follicular apparatus of the intestines in young infants aged from a few days to two months, I saw no other symptoms than those of enteritis. No cerebral complication, nor any of the symptoms which have been attributed to putridity, appeared in these cases, which, however, exhibited, on a post mortem examination, the same anatomical lesions as appeared in adults. This, however, was not the case in infants more advanced in age. The affection then presented a great analogy to that of adults. I will endeavor, in two examples, to convey some idea of this difference; the description of these two cases will enable us to obtain a knowledge of the anatomical lesions which appertain to this disease.

CASE XLVIII.—Meillenet, a girl, aged twenty-four days, entered the infirmary on the 26th of January. She was pale, and a little emaciated; she had been affected with a copious diarrhœa of green matters for two days previous; the abdomen was tense and painful to the touch; the tongue was red at the point, and very dry at the base; the skin very hot; the pulse natural. (*Gummed rice-water, cataplasm to the abdomen, strict diet.*) On the twenty-seventh, the child vomited the drinks; continued in the same general condition, but became progressively emaciated. On the 1st of February, there was not quite so much vomiting, but the diarrhœa, tension of the abdomen, and emaciation continued; a number of wrinkles appeared at the root of the nose, and the face, which until then was without expression, indicated the existence of pain. On the eighth, the same general condition continued; marasmus very much advanced; diarrhœa continued; the discharges yellow, and sometimes green. (*Gummed rice-water, bath.*) From the eighth to the sixteenth, there was a rapid increase of symptoms; excessive weakness; hollowness of the cheeks, and a projection of the cheek bones resem-

bling those of an old man; numerous wrinkles on the forehead; skin of an ash-color; cry extremely feeble. Death occurred on the nineteenth.

On examining the body on the following day, there appeared a general paleness and emaciation. The mouth and œsophagus were healthy; stomach of a rosy hue; some red transverse striæ existed about the valvulæ conniventes of the small intestines, where were also found a number of red projecting pimples; some of them had already commenced to ulcerate. Eight follicular plexuses, very red and much tumefied, existed at the extremity of the ileon; that which terminated this intestine was also a little excoriated and bloody, and the surface was covered with a thick and tenacious mucus. The cæcum was healthy. There existed at the end of the colon a large number of red striæ, and a quantity of purulent mucus adhering to the surface of the internal membrane.

The liver was dark-colored, and filled with black blood; the gall-bladder contained a quantity of liquid bloody bile. The right lung was engorged with blood at the posterior border. The brain was very much injected; its substance was of a bright rose-color; its ventricles contained a quantity of serum.

This child presented no other symptoms than those ordinarily attending enteritis; but such was not the case with the following patient.

CASE XLIX.—François Tessont, aged thirteen months, entered the infirmary on the 12th of September. For several days he had been very restless, and had scarcely slept; the pupils were dilated; the tongue red and dry; the skin very hot; the pulse very frequent. There was neither vomiting nor diarrhœa. (*Gummed barley-water, sinapised pedeluvium, cataplasm to the abdomen, three leeches to the epigastrium.*) On the thirteenth, a very abundant diarrhœa of green liquid matters; abdomen less tender; child cried less and appeared enfeebled. From the eighteenth to the twentieth, there was no change. On the twenty-first, diarrhœa less abundant, and vomiting supervened. On the twenty-third, respiration was painful, and the child exhibited a state of general prostration difficult to describe; the face was pinched, and the forehead particularly exhibited a number of wrinkles which continued even after the cries had ceased; two livid circles appeared about the alæ of the nose; the pulse beat from ninety to a hundred. On the twenty-fourth, the

same general state; the fæces were extremely fœtid; great prostration; extreme marasmus; and the pulse became evidently enfeebled, although the skin presented much of its heat. On the twenty-fifth, prostration complete; facies hippocratica, convulsive motion of the globe of the eye; the bites of the leeches had become violet; they ulcerated, and a purulent sanies flowed from them. The child died on the night of the twenty-sixth. The examination of the body was made on the twenty-seventh.

General paleness and marasmus; an eschar of the size of a two-franc piece was found on the sacrum; mouth and œsophagus healthy; slight redness of the stomach. In the duodenum and ileon there were found a large number of glands, red and tumefied; some of them were open, and exhibited in their centres superficial ulcerations. Twelve follicular plexuses, very red and tumefied, existed at the end of the ileon. In the colon and cæcum there were a great number of isolated follicles about the size of a hemp-seed, and which, instead of being red like those in the ileon, were, on the contrary, surrounded with a blue circle. The circulatory and respiratory apparatuses presented nothing worthy of remark. The brain was injected, and contained in its ventricles a quantity of slightly turbid serosity. The spinal marrow was healthy.

I have selected these two cases from a number in my possession, because they exhibit a remarkable antithesis with respect to their symptoms, while there can be nothing more remarkable than the resemblance in their pathology. The difference of age between these two children can explain, without doubt, the difference of symptoms. Indeed, we almost always see that reaction is very trifling in young infants, although their lesions may be very serious; but in proportion as they advance in age, we are able to observe all the general symptoms depending on the sympathetic relations which exist between the different organs of the system. This observation will be more fully developed when we consider the history of the diseases of the cerebro-spinal apparatus.

From the preceding facts and considerations, it results that follicular enteritis is not to be distinguished by its symptoms from ordinary enteritis, except in children already advanced in age; that in very young infants, inflammation of the muciparous glands of the intestinal tube, although of frequent occurrence,

does not give rise to any remarkable symptoms either in their progress, their peculiar characters, or their complications; it is not until about the seventh, eighth, or tenth month that this inflammation produces any particular symptoms, the assemblage of which constitutes the disease described under the name of entero-mesenteric fever by MM. Serres and Petit, and dothin-enteritis by M. Bretonneau.

Chronic inflammation of the follicular apparatus is met with sometimes, but rarely in infants at the breast. This inflammation is seen principally when there exists tubercles in the lungs, or when the mesenteric glands inflame, become engorged and disorganized.

Enteritis with disorganization of tissue.—Under this subdivision I arrange the inflammatory softening and gangrene of the intestines.

The inflammatory softening must not be confounded with the white softening of the intestinal mucous membrane. It is the former only that we are now to consider.

When the mucous membrane has been a long time the seat of a phlegmasia, the stimulus of which has continually maintained the blood in its tissue, it acquires at first a great degree of friability; it is easily torn with the nail, and when this friable condition is kept up by a continued afflux of blood, it persists for some time, and the membrane becomes disorganized so as to exhibit but few traces of its membranous structure; and when we endeavor to separate it from the other membranes, it is found to be a soft and reddish mass. This disorganization ought to be considered as of a very serious nature, particularly when it occupies a general extent of the intestinal surface. All the children which have exhibited the disease, have experienced during life the most serious symptoms of enteritis; but showing no external evidence by which the existence of this alteration could be known. I shall, on this account, give no examples of it here; for we would but see the collection of symptoms of enteritis already exhibited, of which this softening is one of the fatal terminations.

Gangrene of the mucous membrane of the intestines equally deserves our attention; it appears under different aspects. Thus we see certain ulcerations of the ileo-cæcal region, exhibiting

their edges black like soot, and like that which is observed on ulcerated aphthæ of the mouth. Some circumscribed points of the mucous membrane may ulcerate and become gangrenous, without inflammation having preceded this ulceration, and which always commences in the following manner, as described by Cloquet; a black line appears, about which the mucous membrane changes to a gray pulp. The eschars which then form, soon separate, and are followed by an ulcer with a projecting edge, the bottom of which is destroyed so as to produce a complete perforation. This occurrence is of a very serious nature, for it may give rise to the escape of the contents of the intestines into the abdomen. Adhesions are often very promptly formed between the intestines, which sometimes prevents this effusion.* I have not had an opportunity of seeing this species of gangrenous ulcerations in infants at the breast; yet Cloquet has met with it in children of a very tender age.

As to gangrene produced by excess of inflammation, and which occupies a greater or less extent of the intestines, it is sometimes to be seen in young infants. I shall give a very remarkable example which occurred in a young infant, and where, during life, all the symptoms of dysentery existed.

CASE L.—*Enteritis, gangrene of the colon.*—Caroline Jossey, aged nine days, small and feeble, entered the infirmary on the 7th of November. She exhibited a general redness of the integuments, and an œdematous swelling of the limbs; the heat of the skin was natural; the cry exhibited no alteration; the pulse was regular, beating ninety-two in a minute. This child was attacked with a copious green diarrhœa. An intense redness was observed about the anus: the abdomen was distended. On the twelfth there appeared several streaks of blood in the green discharges from the bowels, which occasionally consisted of black pitchy matters; the general condition was the same. (*Sweetened rice-water, starch injections, milk and water.*) On the thirteenth, the limbs were not so much swelled, the face was pale, the commissure of the lips was drawn backwards, the forehead very much wrinkled, particularly at the nose; the pulse was extremely small and feeble; the bloody diarrhœa continued, and froth issued at the mouth. On the fourteenth, a large quantity of blood passed from

* *Nouveau journal de méd.* by Bèclard, Cloquet, etc. tom. 1, January, 1818.

the bowels ; the face became thin and livid ; the drinks were vomited with a quantity of filamentous mucus. The limbs were cold and livid ; the abdomen contracted ; the pulsations of the heart extremely slow. She died at night, while passing a large quantity of liquid black blood.

On examining the body the following day, a number of sugillations were found on the back and nates. There was a thick layer of yellow mucus on the tongue, a very great congestion of the œsophagus, and a spotted redness of the stomach. The duodenum was healthy ; at the extremity of the ileon there existed an intense redness, with tumefaction and friability of the mucous tissue, and sanguineous exhalation on its surface. The mucous membrane of the cæcum and colon was remarkable for its thickness and its intense redness ; it was covered with blood throughout its whole extent. When this was removed, the membrane appeared rugous and bloody ; its surface was furrowed with a number of wrinkles, between which there appeared several excoriated and black lines, as if they had been burned with nitric acid. Besides these furrows, there were, at different parts of the colon, a large number of ecchymosed spots of the same appearance. The mucous membrane was so soft about these points, that it easily separated with the nail. This condition was particularly remarkable about the rectum, where was found a large quantity of blood mixed with membranous shreds of a black color. This intestine diffused an evident gangrenous odor.

The liver was gorged with blood ; the lungs were healthy ; the fœtal openings obliterated ; the brain much injected.

Enterocolitis could hardly have been more violent than in this case. The gangrene of the large intestines was doubtless the result of inflammation, and of the great afflux of blood which took place to the part ; the general prostration and intestinal hemorrhage were here the only peculiar characteristics of this enteritis, which exhibited, besides, the ordinary symptoms of inflammation of the intestines.

All the varieties of intestinal inflammation have now passed in review. We have pointed out, as far as possible, the peculiar symptoms of each of these varieties ; and it now remains to study the phlegmasiæ of the mucous membrane with reference to their seat.

From the most remote antiquity, the diseases of the small were

distinguished from those of the large intestines. Celsus has observed that this distinction was long before made known by Diocles. "Diocles Carystius tenuioris intestini morbum, *χρόδαψου*, plenioris, *ειλιδου* nominavit. A plerisque video nunc illum priorem *ειολιδου*, hunc *κολικδου* nominari." In dividing then, at the present day, the diseases of the intestinal tube into two sections, we follow a method supported by the experience and authority of the most ancient authors.

But an important question here arises; is it easy to distinguish in very young infants, during life, inflammation of the small intestines from those of the large? We will answer by facts.

I will, in the first place, observe that it has always been impossible for me to establish a well-marked distinction between inflammation of the duodenum, and that of the rest of the small intestines, in nursing children, and I will on this account use the more general term enteritis or ileitis, to distinguish the inflammatory affection of the small intestines; and will denominate that of the large, colitis.

In eighty cases of inflammation of the intestines that I examined with great care, there were thirty of entero-colitis, thirty-six of enteritis, and fourteen of colitis.

In the thirty cases of entero-colitis, there were twenty with diarrhœa of yellow or green matters; in the other ten, the diarrhœa was not noted. In all, there was a distension of the abdomen, which was more or less painful on pressure. In twelve of these children there was vomiting of yellow matters, although there existed no gastritis. In all, there was an erythematic redness about the anus, of greater or less intensity; caused, doubtless, by the abundance and contact of the alvine dejections. The tongue was very often red and dry; the skin very hot and arid; but the pulse was rarely raised to the degree that generally indicates fever; in several of the cases the pulsations were feeble and slow.

In the thirty-six cases where the small intestines alone were affected, there were twenty instances of vomiting, either of drinks or of intestinal matters; and among twenty cases of vomiting, the inflammation was seated in the ileo-cæcal region, and even at the valve, in fifteen instances; it is possible, therefore, that the obstruction resulted from the tumefaction of this valve, and this

consequently produced an interruption in the course of the intestinal matters, followed by vomiting. In every instance the abdomen was tumefied, if not at the commencement of the disease, at least during its course. There were twenty-five instances of diarrhœa, consisting of yellow, and often of green matters, analogous to the meconium; the tongue was almost always red; the skin hot; the pulse but little disturbed, except in two infants, considerably advanced in age, one of whom had a very severe inflammation of the muciparous follicles. I also noticed a redness about the anus of all.

Lastly, there existed a diarrhœa in fourteen affected with colitis; the tympanitic state of the abdomen was in general less; in six cases only, was there vomiting, and I often observed a very remarkable dryness of the integuments, which in general were cold and livid. The pulse was not quicker than in the preceding case.

The eighty children forming the subjects of this analysis, were, for the most part, aged from one day to six months; some were from the age of six months to a year.

From this calculation, it is evidently very difficult to make a correct diagnosis of inflammation of the intestinal tube in sucking infants, yet it would seem as if the proper signs of enteritis or ileitis were the rapid tympanitis of the abdomen, the diarrhœa accompanied with vomiting; while in colitis, diarrhœa alone, without tympanitis, is the most frequent.

The complication of gastritis with enteritis, or gastro-enteritis, is extremely common in young infants; the predominance of the symptoms peculiar to gastritis, and which have already been described, will alone enable us to suspect the existence of this complication.

In the impossibility of tracing with exactness the series of symptoms peculiar to inflammation of each of the parts of the digestive tube, we shall only present an analysis of the causes, symptoms, and ordinary progress of inflammation of the mucous membrane of the intestines in general.

Causes.—The injection of the intestinal tube at birth, the facility with which this apparatus becomes injected, producing very considerable congestion upon the slightest disturbance occurring in the course of the blood in the thoracic and abdomi-

nal vessels, the ingestion of aliments too stimulant, too nutritious, or too difficult to digest; and lastly, the functional activity of the digestive apparatus from birth, are the numerous causes of inflammation of the digestive passages of young infants. The activity of these various morbid causes, easily explains the frequency of diseases of the digestive organs of young children. Of all the affections to which they are liable, these are the most numerous and most fatal; we should, on this account, exert the utmost care in directing and superintending the mode of alimentation to which nursing children are subjected.

The diseases of the digestive tube do not always present, at the commencement, a well-marked inflammatory character; at first, they frequently are only simple passive congestions; but the continuance of the blood in the tissue of the mucous membrane, really excites inflammation, as is observed in old people, or in those individuals affected with diseases of the heart and large vessels.

Symptoms.—The symptoms of diseases of the digestive passages in young infants are almost always local; they do not give rise to symptoms of reaction such as is observed in adults, except as the children advance in age. We ought, therefore, particularly to direct our attention to the disturbance of the digestive functions, when we wish to make a correct diagnosis of the diseases of the intestines.

Vomiting is very frequent in enteritis, but it generally presents this peculiarity, that the matters vomited are yellow and frothy, and that it does not occur immediately after the ingestion of drinks. Diarrhœa almost invariably exists; the discharges are green and yellow, and are rarely serous. In the latter case it is generally owing to an increase of secretion, caused by functional activity and a morbid development in the follicular apparatus of the intestines. The tympanitis and tension of the abdomen, its pain on pressure, are also remarkable, and almost constant signs of enteritis. Unite to these symptoms, those of redness and dryness of the tongue, heat of the integuments, but which, towards the end of the disease, become cold and icy—lastly, erythema of the anus and surrounding skin, and then we have the most common symptoms of gastro-enteritis, and of entero-colitis.

While these symptoms successively succeed each other, and

the disease which causes them is making its progress, the child falls into a complete marasmus, the integuments assume an ashy aspect, the osseous projections become more evident than is usual at this age, the fat of the cheeks disappears, and they become hollowed; the orbits are sunken like those of old people; the face acquires the same old appearance which is observed in adults, arising doubtless from the absence of the teeth, which, in the infant, as well as in the old man, gives the physiognomy an expression altogether different from that of adults who still retain the two dental arches. Lastly, several lineaments are seen upon the face, which we will endeavor to compare with those which M. Jadelot has pointed out in children of a more advanced age.

M. Jadelot describes the nasal lineament as appearing on the inside of the alæ of the nose, and embracing the whole of the orbicularis oris muscle; and the genial lineament, that which extends from the commissure of the lips, and loses itself near the lower part of the face: he regards both these as a symptom of abdominal affections. In very young infants, although these signs are not observable with great distinctness, yet they are still to be seen in some degree. The commissure of the lips, for instance, as I have often indicated in the cases mentioned, is drawn outward, thus causing a fold of skin more or less prominent on the outside of the orbicularis oris muscle; there is also formed another fold, very analogous to the genial lineament, which is directed from the inferior lip towards the chin; this, however, is less frequently seen than the preceding. Other folds of the skin which are constantly to be observed in abdominal affections, and which are also noticed under all circumstances where the child experiences violent pains, are remarked at the root of the nose and in the forehead. The skin at this part presents a wrinkled aspect, and a well-marked indication of distress which ought not to be neglected. I have always been struck with the coincidence of these irregular wrinkles on the skin of the forehead, with the existence of an inflammation of the digestive passages. Altogether these traits give to the physiognomy of the child an expression known ordinarily by the name of "face grippée;" this expression is always an index of a violent gastro-intestinal phlegmasia.

Treatment.—The treatment of enteritis and of gastro-enteritis ought to be grounded on the doctrines we have advanced in this article. We have seen that a sanguineous congestion of the abdomen is often the primary cause of phlegmasia of the intestinal tube; when we are called, therefore, to prescribe for enteritis at its commencement, the application of one or two leeches to the anus ought not to be neglected, particularly if there be any signs of sanguineous plethora present. Abstinence from the breast is very necessary, and the use of mucilaginous and demulcent drinks, such as a sweetened decoction of marshmallows, milk diluted with barley-water, etc., ought to be substituted. If the child appear to suffer much, and if the diarrhœa be very abundant, enemata of starch, with from four to eight drops of laudanum, ought to be administered. Preparations of opium ought to be given to young children with great caution, for their action is much greater on them than on adults; it would even appear as if the absorbent function of the rectum is in a greater degree of activity. I have often seen infants, from the age of eight to twelve days, almost completely narcotized by six drops of laudanum introduced into the rectum by an enema. Three to four ounces of fluid is sufficient as an enema for very young children. A larger quantity distends the intestines, and forces them to return the fluid before it has had time to produce any effect. On no account should the application of cataplasms to the abdomen be omitted. The greatest benefit will arise from the use of emollient baths, and nothing so soon arrests their cries and their pain; for they often become so tranquillized as to fall asleep as soon as they are immersed in the bath. The hours of feeding, and the quantity of aliment, ought particularly to be regulated.

Before concluding my remarks on phlegmasiæ of the gastrointestinal mucous membrane, there still remains a question for me to examine. Do the violent pains of the bowels experienced by an infant, for a greater or less time after birth, arise from an inflammation of the digestive passages?

I believe that these colic pains may arise from several different causes. These are—1st, The difficulty of the first alvine evacuations. The retention of the meconium, for instance, may cause violent pains in infants, analogous to those which are experienced

after a long and obstinate constipation. This is what we have seen in children affected with an imperforate anus. In these cases, the alvine evacuations ought to be excited by means of injections with olive oil, or castor oil. Two drachms is sufficient, in two ounces of tepid water. A suppository of soap might also be introduced into the rectum. It would be proper, likewise, to give the child one or two tea-spoonfuls of syrup of rhubarb or chicory. 2dly, I have examined, after death, the bodies of a number of infants that have been affected with colic, or sharp pains, after their birth, where I have almost always found, either a congestion, or more often an inflammation of the intestinal tube; it would appear, therefore, that abdominal pains, the restlessness and cries which they produce, are probably the result of phlegmasia of the intestines. 3dly, The pains may be caused by ileus or peritonitis; whence it follows that it is impossible to establish, in a general manner, a treatment for colic of young infants, because the causes which produce it may vary almost to an infinite degree.

It would appear, nevertheless, that infants are liable to certain spasms of the intestines, of which authors have vaguely spoken in their works. It is to be regretted that, for the most part, they have not accompanied their descriptions with an account of the post mortem appearances; we shall endeavor, however, to obtain a knowledge of what is meant by this term.

ART. 3.—Spasm of the Intestines.

The intestines, after birth, sometimes become extremely irritable, and are affected with spasms, in consequence of which the digestive functions are completely disturbed; sometimes also general convulsions or spasmodic movements of the face and limbs occur. It is often impossible to understand the cause of these convulsions, which frequently cease and reappear with greater intensity at a period more or less remote from the appearance of the first symptoms. These symptoms are as follows: the abdomen swells, the child cries acutely, the face is contracted, the limbs are stiffened, the bowels are very tender to the touch, the alvine evacuations are suspended, and vomiting sometimes supervenes. I have seen infants seized with these nervous colics

while sucking; they quitted the breast abruptly, cried suddenly and violently; the abdomen swelled immediately, and their agitation did not cease until a quantity of gas had escaped by the anus.

Dr. Joseph Parrish, one of the physicians of the Pennsylvania Hospital at Philadelphia, has published in the *North American Medical and Surgical Journal* a very interesting article on this subject.* It is probable, he observes, that this spasmodic affection has its seat in the intestines, and particularly in the muscular fibres. Children experience a very great relief upon the expulsion of gas, which is contained in the intestinal tube in such quantities as to give rise to a true tympanitis. In one case that I saw in 1821, says Dr. Parrish, death enabled me to verify my views on the cause of this affection by dissection.

"The subject of this attack was an infant about five months old. The convulsions came on instantaneously, without the least warning, and immediately after they had passed, the patient was quite sensible and even playful. At first, several days intervened between the fits; and, contrary to the general rule, they came on at one stated time, about, or a little after, daybreak. They afterwards became more frequent and distressing, and towards the close of the case, several spasms or partial convulsions occurred at intervals, the child screaming out, and appearing to be much in pain. The treatment was principally directed to the bowels; but leeches were twice applied to the head, and blisters were placed behind the ears. Though relief was occasionally obtained, yet no permanent impression was produced upon the disease, and notwithstanding all my efforts, the little sufferer expired. Upon dissection, the bowels exhibited strong evidence of having been under the influence of severe spasm. More than half of the small intestines were irregularly contracted. In some places, for more than an inch in extent, the bowel was reduced to the size of a goosequill; in others, it appeared as if tied by a thread, its calibre being almost obliterated. The omentum was closely folded up in the form of a thick twine or small rope, and lay on the arch of the colon. In the gall-bladder was a

* On infantile convulsions arising from spasm of the intestines. *N. A. Med. & Surg. Journal*, January, 1827.

light-colored and glairy fluid. No other sign of disease was visible in the cavity of the abdomen and thorax. The condition of the brain I did not examine."

It is evident there had been spasmodic contraction of the intestinal tube; but it is unfortunate that the brain was not opened, because there perhaps the cause of the spasmodic disease might have been found, which perhaps was but a secondary affection.

The formation of gas in the intestines often gives rise to symptoms nearly resembling those which we have just pointed out; they cease as soon as the gas is expelled, thus proving that this is the true cause.

In the treatment of this disease, two things ought to be considered: the nervous excitement, which produces it, and the disturbance of the digestive organs which follows. The spasm of the intestines is evidently owing to an irritation of the cerebro-spinal apparatus, which must first be attended to in the treatment; two or four leeches should therefore be applied to the mastoidean region, or blood be taken from the arm or foot. The application of leeches is preferable to general blood-letting, if the cerebral irritation be owing to an accumulation of blood about the head, and if the extreme feebleness of the patient appear to counter indicate general bleeding. At the same time warm baths should be used, for they are excellent antispasmodics.

Among the antispasmodics, *asafoetida* has been recommended to be given in injections; this might be assisted by adding a little laudanum; two to five grains of *asafoetida* with two or three drops of laudanum, will be sufficient for an injection. Dr. Parrish recommends the rubbing of the spinal region, at the same time, with a liniment composed of a tea-spoonful of oil of amber and laudanum in a table-spoonful of olive oil and alcohol. He considers the irritation of the gums produced by dentition, as one of the causes of this spasmodic affection, and therefore recommends us to examine the condition of the gums, to cut them, and thus to allay the irritation in the mouth. But if dentition, and the consequent irritation of the gums, be the predisposing cause of the intestinal spasm, it is not excited however until after having sympathetically irritated the brain, and the nervous system ought therefore to be attended to first.

The removal of the constipation ought not to be forgotten, by which also the expulsion of gas is effected. Gentle laxatives, the introduction of a suppository of soap into the rectum, will accomplish this object. Dr. Parrish has removed the gas by introducing an empty syringe into the rectum, and then pumping out the air. A gum elastic tube might be passed into the intestines, by which the air could escape while compression is gently made on the abdomen. I have not considered this affection at length, because it appeared to me to belong more particularly to the diseases of the nervous system, of which we shall hereafter treat.

ART. 4.—White Softening of the Gastro-intestinal Mucous Membrane.

I did not speak of this alteration of the mucous membrane immediately after inflammation, because I have not seen it as the result of inflammation.

We have already seen that, in consequence of bad or imperfect nutrition, children often become pale, sink into a state of marasmus, and die. Upon opening the bodies of these children, the mucous membrane is found pale and colorless, like the external integuments. Now this state of the internal membrane of the digestive tube is the first stage of softening of the intestines, a softening which must not be confounded with that which is produced by an afflux of blood in the mucous membrane in consequence of the inflammation developed in it.

The softening appears then in two stages, that in which the membrane is only discolored; here the mucous tissue does not present its proper consistence; it is raised with the greatest ease when scratched, but the shreds are still membranous. Notwithstanding this, it may be destroyed with facility. In this case, the mucous membrane presents still here and there a mottled red, which are the last traces of its normal color, or of the accidental redness of which it is the seat, as was the case in the following subject.

CASE LI.—Fanny Bombardy, aged ten days, entered the infirmary on the 16th of November. She was robust, skin of a vermilion color, and she exhibited an induration of the cellular tissue of the superior and inferior extremities. From the sixteenth to the twentieth, the œdema of the limbs disappeared, but vomiting and co-

pious diarrhœa supervened. Some points of muguet appeared on the edges of the tongue. On the twenty-fifth, the muguet disappeared; the diarrhœa continued, and the child constantly passed a quantity of yellow frothy matters. She became pale and emaciated. On the thirtieth, there was a rapid progress of emaciation; a universal discoloration of the integuments, which were of a very remarkable chlorotic paleness. The child was without fever; cry feeble; the skin cold, particularly on the limbs. From the 1st to the 6th of December, all these symptoms continued with great intensity; the diarrhœa continued to be abundant: vomiting still existed; at last the child, pale, feeble, and excessively wasted, succumbed on the eighth, after vomiting a large quantity of green and yellow matters.

Post mortem examination.—There was a general discoloration of the integuments, and some violet-colored sugillations appeared on the back and nates. The base of the tongue exhibited a violet ecchymosis about the size of ten-sous piece; the œsophagus was pale throughout its whole length; the stomach exhibited the same appearance; but besides this, four superficial excoriations, three lines in length, and pale like the rest of the membrane, were found near the pylorus. The mucous membrane of the small intestines presented, throughout its whole extent, a marked discoloration; it was at the same time so friable, that on scraping it very slightly, it was raised in small shreds which were easily reduced to a soft mass. In the ileo-cæcal region there existed several follicular patches, which partook of the paleness of the rest of the intestines, and besides this, there were in the same region a mottled redness, pale at the edges, and which appeared to be the traces of the color of the intestinal tube before it changed.

The liver was large, and filled with blood; the gall-bladder very much distended by a large quantity of green porraceous bile; the lungs were gorged with blood; the fœtal openings obliterated; the brain very much injected.

It is remarkable that the large abdominal veins in this child had retained much of the blood, while the mucous membrane was entirely colorless. Softening of the digestive mucous membrane supervened here in a child who was doubtless affected prematurely with gastro-enteritis; and this gastro-enteritis having suspended the digestive functions, produced marasmus, paleness, and afterwards a softening of the digestive tube from a defect of alimentation. If this softening were the necessary re-

sult of inflammation, there never would occur softening without inflammation ; yet we have seen the contrary of this. The subject of the following case was in a condition analogous in every respect to that usually occurring in the marasmus and wasting of a child badly nourished, and of which we have already spoken when treating of intestinal indigestion.

CASE LII.—Louise Massan, aged one month, had been suckled at the Hospice des Enfants Trouvés since birth. She was pale and thin, as all are that are under the care of the hospital nurses. She vomited often, and was affected with a diarrhœa of green matters, which ceased spontaneously after two or three days. This child entered the infirmary on the 26th of February. She was thin, pale, and very quiet ; the skin was so white as to be almost transparent, and the small blue veins could be distinctly seen on various parts of the body. She was not affected with fever, respired well, and cried but little. (*Sweetened rice-water, milk and water.*)

This child remained in the infirmary until the 1st of April, without presenting any other symptom than those just described ; during this time she became affected with marasmus, and the skin assumed the appearance of wax. She died on the 1st of April. On opening the body, the abdomen was found excessively distended with gas, and the intestines were so thin and transparent, that their contents could easily be seen through their walls. The stomach, small and great intestines, exhibited, through their whole extent, a chlorotic paleness, and the mucous membrane was so soft, that the mere touch reduced it to a soft mass, resembling mucus more than a membranous substance. The liver, spleen, lungs, heart, and brain were healthy, and all these organs were exsanguineous.

This infant was doubtless reduced to this state of marasmus and extreme feebleness by the insufficient and improper alimentation to which she was subjected, the effects of which were materially aided by her prolonged continuance in the infirmary, where a great number of sick children were assembled, rendering the air insalubrious. The softening in this case was not preceded by inflammation, but had been for a long time coming on from an opposite cause. Sometimes this softening, instead of being general, is only found in a few isolated points of the intesti-

nal tube. It is met with not only after birth, but likewise in children who die during birth, as I have often had occasion to observe. It appears always to follow an absence of the blood in the mucous tissue; it is this which has led M. Denis to consider it as a sort of retiring of the blood, *retrait du sang*, as he has termed it. But here the absence of the sanguineous fluid is not the immediate cause of the softening; it is itself, like the paleness and softening, the effect of a default of alimentation; besides, there is not, properly speaking, a retiring of blood; for whence would it retire? When an infant dies in the condition we have just described, all its organs are found exsanguineous, particularly the external integuments; and it is rather to be attributed to a diminution, alteration, and suspension of sanguification, the disturbance of which function being caused either by the indigestible drinks taken, or by the unhealthy air respired; so that the very spring of life is insensibly dried up, and the child perishes from debility and hunger. The white softening now under consideration, is, therefore, to be regarded as an advanced stage of the discoloration of the intestines pointed out in the history of intestinal indigestion, the cause of which has its origin in the insufficient and improper alimentation to which an infant is exposed in hospitals. This softening has apparently some analogy to that which is both generally and locally developed in the intestinal tube of persons affected with phthisis, upon the nature of which MM. Louis and Andral have made some interesting researches.

Among the symptoms indicating this sort of softening, we will particularly point out the general discoloration of the integuments, and the blanched appearance of the children affected with it, the skin having a close resemblance to that of a chlorotic girl. Other symptoms, such as diarrhœa, tympanitis, etc., being common to other intestinal affections, cannot be considered as of any importance in the diagnosis of this disease.

Softening of the intestines must be regarded as an affection altogether incurable; an entire regeneration of the mucous membrane would be necessary, which is an impossibility. The treatment ought then to be previously directed to an attempt to remedy the first effects of the want of alimentation, and in having recourse to every means that can restore the impaired condition of

the digestive functions, before the disorganization of the mucous membrane has occurred.

ART. 5.—An examination of the principal Symptoms of the Diseases of the Digestive Canal.

All the lesions to which the digestive apparatus is liable, have been considered; and I will now endeavor to give an account of the symptoms proper to each, and such as may be recognised during life. Authors, generally, who have written on the diseases of children, have been more systematic, and have taken the symptoms, or the groups of symptoms, as a foundation of their divisions, without regard to the anatomical lesions. In a rapid examination, I propose to estimate the value of these symptoms, together with their relation to the anatomical lesions of which they are the effect.

Vomiting.—Vomiting may occur from several causes; such as gastric or intestinal indigestion, produced probably by the bad qualities of the milk, œsophagitis, gastritis, enteritis, particularly when seated in the ileo-cæcal region, interruption of the course of fœcal matters from invagination or spasm of the intestines, and lastly, from softening of the mucous membrane. In considering this symptom, the cause producing it should always be taken into account, and the facts properly studied. It is impossible to draw any practical inference from this symptom taken separately; but to give its clinical history it will be necessary to examine all the affections of the digestive tube, for vomiting, as we have seen, is common to all of them. This manner of considering and estimating the vomiting of infants at the breast, appears to me much more philosophical than to imagine and establish, *à priori*, the causes of this morbid phenomenon, as has been done by a number of authors.

Diarrhœa.—Diarrhœa is not a constant sign of enteritis; it may be produced by intestinal indigestion, by a state of irritation, or an increase of the secretion of the follicular apparatus, by colitis, or enteritis. The discharges vary in color and consistence; a yellow, frothy, and fluid diarrhœa is very often accompanied with inflammation; a white and mucous diarrhœa is often produced by an augmentation of the secretion of the muciparous fol-

lices; when mixed with green flakes, it often exists without inflammation.

Redness surrounding the anus.—This exists in almost every case of diarrhœa, whether with or without inflammation.

Tension of the abdomen.—This affection is usually observed in enteritis, and is then accompanied with abdominal pain. The distension of the intestines by gas, when it arises from spasm of the intestines, produces the same phenomenon; but it is intermittent, and the pain ceases when the gas escapes, while it continues without intermission when arising from inflammation. Tension of the abdomen, when there is softening of the mucous membrane, generally exists without pain, and is accompanied with a state of general wasting and paleness.

Colic.—Colic may be spasmodic, or the result of inflammation, invagination, imperforation of the anus, distension from gas during inflammation, or when this pathological condition does not exist, it may arise from indigested aliments remaining for some time in the intestines. This is what authors have described under the name of flatulence.*

Cholera.—Cholera is not generally noticed in our climate; it is a disease peculiar to infants in the United States; and as I have not observed any thing analogous to this affection, I must be indebted to Dr. Dewees for the principal details of the symptoms.†

This disease begins with vomiting, copious diarrhœa, great cerebral affection, and an intense thirst. The pulse is small, quick, and corded. The evacuations from the bowels vary considerably; they are sometimes yellow, brown, and watery; at other times, more thick and tenacious; they are sometimes mixed with blood, and almost always yield an odor exceedingly offensive. The irritability of the alimentary canal is sometimes so great that the ingesta rapidly pass off as in lientery. The skin of the forehead is tight; the eyes are sunk; the nose is sharp, and the lips are shrivelled; the belly is tumefied; the feet are œdematous, and aphthæ appear. This condition may continue for five or six weeks, but as death approaches, a gradual

* See Appendix.

† *A Treatise on the physical and medical treatment of children*, by W. P. Dewees, M. D., 2d edition. Philadelphia, 1826, p. 395.

aggravation of symptoms take place. Sometimes there are seen on the chest an immensity of watery vesicles. Children are sometimes seen thrusting their fingers into the back part of the mouth, as if desirous of removing something. The popular opinion is, that there is a worm irritating the back part of the throat.

Dissections show the following anatomical lesions: the brain is generally in a state of congestion; the thoracic viscera are rarely affected; but it is on the contents of the abdomen that it mainly expends its force; the stomach and small intestines exhibit dark livid spots dispersed over the mucous membrane, particularly near the pylorus. In many parts there is an alteration of the structure, by the thickening of their coats; so much so, that the calibre of the tube is reduced considerably. The large intestines are seldom or never involved in the mischief, excepting where the disease assumes a dysenteric form. The liver is of a large size, and filled with blood, and the gall-bladder is filled with a dark green bile. The other viscera of the abdomen are usually healthy.

It is evident that all these symptoms described by Dr. Dewees, are those of a violent gastro-enteritis, complicated with hemorrhage, of which affection we have given several examples, (v. cases XLI. and L.,) and although cholera infantum is rare in our country, yet there sometimes exist instances of it, particularly in our hospitals, where children are brought that are born in the midst of the most frightful misery, scarcely protected by a few rags from the inclemency of the atmosphere. Dr. Dewees has detailed the treatment of this disease at length; and in truth, nothing, in our opinion, can be more irritating than his method; he attaches too much importance to the treatment of the prostration and the symptoms of putridity. He also advises the treatment to be commenced with vomiting, and afterwards a teaspoonful of strong coffee, without sugar or milk, every fifteen minutes, to be given especially to very young children. We have, says he, since we first tried it, seen it act like a charm. He adds, "If the stomach has not been tranquillized by the coffee, we immediately commence with minute doses of calomel, but never combined with opium. The following is the form and average dose we use:

R Calom. ppt. gr. iij.
Sacch. all. gr. vi.
M divid. in pulv. xij.

This should be given until the stools become less abundant, and less green." When the evacuations of the bowels are moderated, injections with laudanum, proportionate to the age of the child, should be administered; to this is added the use of rhubarb and absorbent powders, the application of blisters to the limbs, and dry frictions with flannel, etc. Such tonic treatment might perhaps succeed in a climate different from ours; but when the nature of the anatomical lesions which produce the symptoms constituting cholera infantum, are considered, we ought certainly to hesitate about employing it; and it must be acknowledged that it has not been very successful in America, since the disease still continues to make frightful ravages in that country. Indeed, Dr. Parrish commences an essay, which he published in 1826, with these remarkable words: "The great mortality of cholera infantum renders it one of the most interesting diseases which comes under the notice of the physician. Its ravages among the infant population of our large cities, are well known and too strongly felt to require any comment. No disease contributes so large to swell our bills of mortality during its prevalence; and were it not restricted to the summer season, it would prove a greater scourge to the community than consumption itself."*

Considering the nature of this disease, if the American physicians were to adopt a system of treatment less inflammatory, they might perhaps have less reason to lament the ravages of this species of gastro-enteritis.

Dr. Dewees advises the removal of the child from the infected atmosphere to the country as a preventive, and to this precaution Dr. Rush recommends nourishing the child with milk, to cover the skin with flannel, and to avoid the use of fruits, being careful, at the same time, to give as aliment nothing but farinaceous substances, as rice, arrowroot, biscuit, etc., and some time after the appearance of the teeth, to give a little animal food to strengthen the digestive organs.

* *Remarks on the prophylactic treatment of cholera infantum.* North American Medical and Surgical Journal, July, 1826.

Dr. Parrish, in the memoir cited, also insists much on the necessity of a tonic and stimulant diet, as a prophylactic of cholera. In this manner he was enabled to raise the child of a lady who had previously lost eight children from this disease. This child, from its earliest infancy, was accustomed to the most stimulating food, and several spoonfuls of ginger tea were daily given to it, followed afterwards by the juice of meat. During the summer, the nurse used the most nourishing aliment, taking the precaution not to eat either fruit or vegetables. The second year, various preparations of animal food, beef tea, port wine, etc., were adopted as diet for the child, until it had passed the period of dentition, without experiencing any symptom of disease, the very idea of which was extremely distressing to the mother.

I know of no practitioner in France that would be tempted under similar circumstances to adopt the same method of alimentation for infants, or to approve of its use.*

Symptoms of reaction of intestinal diseases.—A very remarkable fact, and one to which we have frequently alluded in the view we have taken of the diseases of the digestive apparatus, is, that generally in young infants there do not exist so well-marked symptoms of reaction as in adults. The heat of the skin alone is augmented, and we have seen a great number sink under the most serious lesions, without exhibiting any fever, the feebleness of the pulse being rather a symptom of reaction than the acceleration of the circulation. Thus then, age exerts an important modification on the affections of the digestive tube.

I shall finish this long chapter with an observation worthy of the attention of all pathological physiologists; it is, that the digestive apparatus, possessing at the period of birth an advanced state of formation and development, and fulfilling functions of great activity, becomes at the same time the seat of a great number of diseases in young infants; it is indeed by derangement of the digestive tube that great numbers of them perish, and it is by means of this, that their general health becomes affected, and the proper development of their constitution is prevented.

I have not spoken of intestinal worms; children at the breast being seldom or never affected with them.

* See Appendix.

CHAPTER III.

DISEASES OF THE APPENDAGES OF THE INTESTINAL CANAL.

SECTION I.

DEVELOPMENT AND CONGENITAL MALFORMATIONS OF THE
LIVER.

THE liver begins to be developed at a very early period; Walter has proved that in the embryo of three weeks, its weight is half that of the rest of the body; and in the fœtus at the full term, with reference to the body, it is as one to eighteen or twenty.* In the infant at birth, it fills almost the third of the abdominal cavity, for it descends even to the crest of the ilium. During the intra-uterine life, therefore, the liver exhibits very early a development sufficient to allow of its being considered as one of the most important abdominal organs; it exercises indeed some essential functions with respect to the fœtal circulation; and perhaps also with respect to nutrition, for its secretion may in some sort concur in the alimentation of the fœtus. I shall not stop to examine this idea, which may as yet be regarded only as a conjecture.

Congenital malformations.—The liver is only completely absent in cases of complete acephalia; it does not always occupy in the infant at birth the place which nature generally assigns to it; and it may be found on the outside of the abdomen, in cases of an imperfection of the walls of the abdomen, and even in the thoracic cavity, when a portion of the diaphragm is wanting. It also exhibits deep divisions, and sometimes alterations of form of little importance.

Absence of the gall bladder, when the ducts exist, is possible, without being productive of any accident; but I do not know that children are ever born with a complete absence of the biliary ducts.

* Meckel, *General Anatomy*.

In a word, children at birth are rarely affected with malformation of the liver, which, like the greater number of those heretofore considered, alter the health or compromise the life of a newborn child.

SECTION II.

DISEASES OF THE LIVER.

English physicians attach the greatest importance to diseases of the liver in children, as they do also in adults. Most of the disorders of digestion are attributed by them to a derangement of the functions of this organ; they attribute many diseases to the qualities of the bile that the liver pours into the intestines. In order to obtain fixed data upon this subject, I have examined the liver in a number of infants with great care, and considered especially the physical qualities of the bile, and the symptoms which they had presented during life, and I have never seen any thing in these lesions and symptoms which could explain the ideas of the English pathologists in reference to the influence which affections of the liver might exercise upon the health of the child. Before exhibiting the general results of these researches, I will say a few words on the diseases of the liver developed before birth.

Congenital diseases of the liver.—This organ is often the seat of sanguineous congestion during intra-uterine life. It is frequently of a dark red color. In two instances I found its tissue considerably softened, and diffusing an odor of sulphuretted hydrogen: in both these cases, the children had arrived at the full term, possessed a good constitution, and externally exhibited no evidence of wasting. I once found in the liver of a newly born child, a number of small tuberculous granulations; they also existed in the spleen and lungs. They will be considered when we come to treat of pulmonary tubercles. As to the quantity and physical qualities of the bile in infants, nothing is more variable, and I am unable to furnish with regard to it any general and fixed doctrine. In short, passive congestions of the liver are the most frequent lesions of this organ in young infants; a condition easily understood since the hepatic circulation is under

the direct dependence of the general circulation, and would consequently experience promptly the disorders which supervene in the functions of the circulating apparatus.

Diseases developed after birth.—In order properly to appreciate the changes which take place in the liver, we must first make known its various aspects in a state of health. In nearly all newly born children, the liver is of a deep reddish brown, and is almost always gorged with blood, which issues in numerous drops whenever the organ is cut, and is generally black and fluid; the gall-bladder long, and of little volume, is filled with viscid bile of a porraceous green. In proportion as the child advances in age, the sanguineous engorgement becomes less, and the bile somewhat more abundant, and the gall-bladder more distended.

The consistence of the tissue of the liver is such, that it can always be cut smoothly, and does not tear except upon the application of considerable force.

Congestion.—The slightest impediment to the circulation gives rise to passive congestions of the liver. These congestions are very common in infants at birth, and vary considerably with respect to the quantity of blood accumulated in the tissue of the organ. It is sometimes also found there in so great quantity as to produce a sort of sanguineous exudation on the surface of the liver, particularly on the convex portion, which is in this case covered with a layer of blood over its whole extent. I have also seen in several infants, an effusion of blood in the abdomen, the result of this turgescence. The symptoms presented by children affected with hepatic congestion, are so obscure as to make it difficult to detect the existence the disease; they are the same as those of pulmonary congestion. In asphyxia of new-born children, for instance, there is nothing more common than to find the liver considerably gorged with fluid black blood; the large abdominal vessels and the whole of the circulatory apparatus are in the same condition. Hepatic congestion then arises from a kind of reflux of the sanguineous fluid towards the abdominal organs, among which the liver, by reason of its great vascularity, is peculiarly disposed to injection and engorgement.

The congestions of the liver would appear sometimes to change the nature of its secretion: in some infants, where the liver

was very much injected, I have found the gall-bladder distended and filled with thick bile, of a black green, and even bloody. I once saw in a young infant in the place of bile, black ropy blood. It might be supposed that in this child, the liver, changed in its texture, could not produce in the blood which it receives for the biliary secretion, the vital or physiological modification, which this fluid must undergo to form bile.

The treatment of hepatic congestions ought to be the same as that of intestinal or thoracic congestions, since this condition occurs in all three of them at the same time, all apparently being closely connected by the various branches of the same circulatory trunk.

Inflammations.—I know of no organ the inflammation of which is so difficult to prove, as that of the liver; its alterations of color and texture are so numerous and so variable, that it is extremely difficult to know to what cause to refer these changes; and, without alluding here to the innumerable changes of color in the liver of an adult, I might mention a great variety of color which the liver in a young infant presents. Possessing no positive facts in reference to the anatomical characters and the symptoms of hepatitis in infants at the breast, I shall refrain from being a barren copyist of authors; and, in the absence of data necessary to give a correct history of inflammation of the liver, I shall only record the general results of my researches upon the various aspects of the liver, considered in its relation to the quantity and quality of the bile, and the symptoms which the digestive apparatus presents.

Examination of the different states of the liver, considered in their relation to the qualities of the bile.—These researches were made upon fifty children, of both sexes, aged from one day to six and eight months.

In twelve of these, where the liver exhibited all the apparent characters of a state of health, without being injected or infiltrated with more blood than ordinary, I found the bile discolored and slightly viscid in two; abundant, without color, and clear like serum in three; of a beautiful green, and in small quantity, in one; black and very abundant in two; small in quantity and of a clear yellow in two; of a yellowish green and very viscid in two.

From this it is already seen that, however healthy the liver may appear to be, the color and consistence of the bile are extremely variable. But let us pursue our analysis.

The liver was very much gorged with blood in twenty-eight children; the bile was of a deep green and of the usual quantity in ten of these; in eight others it was of a very pale green; in two it was mixed with blood; it was yellow, thick, and concrete in three; in small quantity and of an ochery color in four; and in one, it was replaced by a white ropy fluid, like mucus.

Thus it appears that the sanguineous congestion of the liver does not produce any alteration of the secretion always identical, at least, in appearance; since we have here seen that the quantity and quality of the bile varies greatly in infants where the liver is found in the same pathological state. There remain ten infants to examine: in these the liver exhibited several shades of color, and the character of the bile was not less variable. In three, the organ was exsanguineous and very pale; the bile was very pale in one, of a very deep color in the second; of a blackish green, mixed with blood, in the third. Here, and this is very remarkable, we find the bile of a deep green in an infant where the liver was exsanguined, whilst in those where the liver was gorged with blood, the bile, on the contrary, was clear and colorless.

In the fourth of the ten children now under consideration, the liver was friable, and had a granulated appearance when torn, and its substance, which appeared infiltrated with a yellow serosity, was of the color of ochre. The bile, which was very abundant, was green and slightly viscid. In the fifth, the liver was of a rose color; the bile was yellow and scanty. In the sixth and seventh, the liver was very large and pale; the bile in one was colorless, and in the other of a yellowish green. In the eighth, the liver was grayish externally; this color only existed at the surface; for, upon cutting into the substance, it was found of a deep brownish red; it was also very friable, and could be torn with the greatest ease. The bile was green and ropy; the gall-bladder was covered on the interior surface with very thick mucus. In the ninth, the liver, externally, was of a slate color, and green internally; it was firm, and left a smooth surface on cutting it; the bile was in its natural condition. And in the

tenth, the liver was reduced to a soft reddish mass, and diffused, when crushed, an odor of sulphuretted hydrogen. The bile was very abundant and of a deep green; it contained a great quantity of blood, which, instead of being mixed with the bile, was separated into distinct clots and filaments.

From these researches it results, that the appearances of the liver are very variable, and of the bile not the less so; and that it is really impossible to establish between the state of the bile still retained in the reservoirs, and the normal and pathological state of the liver, any connection that may lead to general conclusions. The qualities of the bile may vary, from a number of modifications occurring in the secretory process of our organs: modifications which we cannot understand while the veil which conceals the manner of the process from our senses still remains. Thus, then, in ascending to the causes and nature of the diseases of the liver in young infants, I am obliged to acknowledge my ignorance and incapacity; however, I here find an opportunity of pointing out a vacuum to be supplied, and this is a recompense for my trouble, for it is still serving the cause of science to exhibit error, and to learn how to shun it when discovered.

I have not limited these preliminary researches to the consideration of the nature and causes of diseases of the liver, but have undertaken other analytical observations; to ascertain how far authors are correct in attributing to affections of the liver, diarrhœa, consisting either of green or yellow evacuations, with which infants are so often affected.

Examinations of the conditions of the liver and qualities of the bile, with reference to intestinal discharges.—Of forty-eight children that died of enteritis, or gastro-enteritis, twenty had diarrhœa of very abundant yellow fœces, and twenty-six diarrhœa equally abundant of very green fœces. The following exhibits the condition of the liver and bile in these infants: in fifteen, the liver was scarcely injected; and in these fifteen cases, the bile was small in quantity, and very clear in four individuals; it was of a deep green, of the consistence of pitch, and very abundant, in three; and in the remainder presented nothing remarkable. In twenty-five, the liver was gorged with blood, as is often observed to be the case at this period of life; the bile in each of them ex-

hibiting different characters; it varied from a pale yellow to a deep green; in one of them, there existed a large quantity of black blood in the gall-bladder, instead of bile.

With respect to the eight children completing the number of those on whom my researches were directed, the liver exhibited shades of yellow, green, brown, and slate color; the bile was fluid and clear in some, while it was thick and green in others.

Thus it appears that in the forty-eight children to whom I directed my attention, affected with diarrhœa of yellow or green matters, the liver exhibited very different appearances; sometimes it was healthy, often injected, and again it presented certain anatomical characters which the state of our knowledge does not permit us to refer to any class of well-ascertained diseases. What inference is to be drawn from these facts? and what theory is to be established on so uncertain a foundation? Ought we, after the example of most of the English pathologists, to attribute gratuitously to the liver the derangements of the digestive functions? Ought these yellow and green evacuations to be regarded as an alteration of the biliary secretion? I leave it to other authors to answer these questions, when ulterior researches shall throw more light on this subject; as for myself, I will renounce my opinions only when convinced of their error,—still believing that the yellow and green dejections, whatever may be the cause of their color, are more probably a symptom of enteritis, an affection which must be removed before the diarrhœa, which is only its effect, can be cured.

Such, however, is not the opinion of Dr. Dewees, when he says, in his work under the article *Diarrhœa*, “In bilious diarrhœa, the fœces are loose, copious, and of a bright yellow or green; and the bowels are stimulated to inordinate action, by an overcharge of bile, either vitiated or not. This complaint is very frequent among our children during the heat of our summers, or as the fall approaches. The influence of the hot sun upon the actions of the liver, is well known to every body; it is familiar to common observation, that after a spell of very warm weather, even the healthy evacuations of an adult give evidence of its rapid formation, and sometimes of its abundant absorption. Thus the fœces are observed to be loaded with bile; and the urine to be deeply tinged with it; and when the complaint of

which we are treating seizures upon children, it is called the 'summer complaint.' "

Dr. Dewees observes, that no period of infancy is free from attacks of this kind, and he has even seen extensive bilious evacuations from children of ten days old.

The American physicians, therefore, regarding the yellow diarrhœa that affects children during the summer as an indication of an afflux of irritating bile into the intestines, advise, in the first place, to evacuate the bowels, using the remedy for that purpose which exerts a special action over the functions of the liver; such as calomel, given in small and repeated doses. Dr. Dewees has recourse to laudanum to tranquillize the intestinal irritation during the night: he gives half a drop for a child under ten days; a drop for one from that period to the end of the month; a drop and a half or two drops for one from that period to three months; three drops from this time to nine months; four drops from nine months to eighteen. If fever attend the diarrhœa, he advises the use of the warm bath, and tartrate of antimony, which he administers in doses from the tenth to the twentieth or twenty-fourth part of a grain. Mr. Barnes advises besides this, nourishing the infant with beef tea, arrowroot, and white wine whey.*

Thus then while the examinations of the bodies of those who die of yellow or green diarrhœa demonstrate, in almost every instance, the existence of enteritis, the American physicians, without taking this state of the alimentary canal into consideration, advise emetics, purgatives, and stimulants. Perhaps the great ravages of inflammatory diseases, in general, in those climates, may in part be attributed to the method of treatment. Why not endeavor to ascertain whether there really exists an afflux of bile in the intestines in this disease? And why not attempt to show by anatomical researches, that the liver, under the influence of heat, is irritated, and ceases to discharge its normal functions; instead of advancing, without motive and without evident facts, the opinion that the bile neutralizes the acids formed in the stomach, and that when these acids are very abundant, and mix with the bile in such a manner as not to be neutralized, a green color is thereby imparted to the alvine eva-

* Dewees, loc. cit. p. 364.

cuations? A great number of effects are attributed to this acid, which is considered a sort of poison that ought to be speedily removed from the alimentary canal.*

These ideas, transmitted from period to period, with a respect for which it is difficult to account, except by referring it to the blindness with which men sometimes love to retain their prejudices, cannot be sustained by the analytical examination of anatomical facts, and will, with other medical errors, fall into oblivion. If, in overthrowing them, we are unable to place in their stead other theories, it is of little importance, for doubt and uncertainty are still better than error; for instead of satisfying us with easy explanations, they will be continually harassing us with the truth we need, and thus force us to have recourse to new attempts to discover it.

We conclude by remarking that nothing is more difficult than to make a diagnosis of inflammation of the liver, and to prove its existence in infants, by post mortem examinations;† that yellow and green evacuations exist almost always in inflammation of the intestines; that it is not proved to be the result of disease of the liver; that it is much better, when in doubt, to consider these symptoms as those of enteritis, and to treat the child accordingly, rather than to imagine the diarrhœa to be the result of an afflux of irritating bile into the intestinal canal, which it is necessary to expel by purging.

Several authors have spoken of abscesses in the liver in young infants affected with icterus.‡ But as M. Denis has observed, autopsical examinations have not proved the existence of this lesion. There is still another fact pointed out by authors, it is the co-existence of the diseases of the duodenum, and liver. M. Cruveilhier has observed that in infants affected with a softening of the duodenum, there existed at the same time a morbid paleness of the liver. M. Denis also entertains this opinion, but it is necessary here to obtain a correct idea of this softening. I will observe here first, that I found the liver in a very variable condition in children affected with duodenitis. Some of these, who form the objects of the cases

* Dewees, p. 367. See Appendix.

† This distinction is not much easier in adults, v. Andral. *clinic. medie.* t. 4.

‡ Baumes, *Ictère des enfans de naissance*. Paris, 1806.

enumerated above were affected, as I have already said, with phlegmasia of the duodenum; but we ought to call to mind the great variety of appearance which the liver presented. As to the softening, I am not of the opinion of MM. Cruveilhier and Denis, if they allude to inflammatory softening, that which follows greater or less intense inflammation of the mucous membrane of the intestines; but if they refer to the white softening, it is quite another thing; all the organs, and every part, are blanched and exsanguineous, and it is not surprising to find the liver also in the same condition.

I do not speak here of icterus of young infants, because I do not consider it as a symptom of an affection of the liver. I shall examine this subject hereafter.

The gall-bladder appears to me to be seldom diseased; I have not often had occasion to observe its congenital malformation; M. Denis mentions his having met with its absence in three instances. It is sometimes very slightly developed and reduced to a small globular pouch; generally its walls are colored green by the bile, and its internal surface covered with a thick layer of mucosity; its walls are in this case thin and transparent; and vascular ramifications more or less numerous are seen on its surface. I once found in the dead body of a child whose case I had not particularly noted, the gall-bladder evidently inflamed; its internal surface presented a bright redness, and the thickness of its walls was considerably increased. It is very common to find in it a very minute spotted redness, which can scarcely be seen except after removing the bile which generally covers the surface of this viscus.

Alterations of the biliary ducts, such as stricture, obliteration, and inflammation, occur much more frequently in adults and old men than in young infants.

Diseases of the spleen and pancreas, which are also appendages to the intestinal tube, have not furnished me with any thing worthy of notice: congestions of the former are the disorders most usually observed. I have cited an instance of its rupture in consequence of this pathological state.

In infants at the period of birth, the pancreas exhibits a development considerably advanced; I do not doubt that it concurs in the performance of the digestive functions, and pours its secre-

tion into the intestinal canal; but I have been unable to prove whether the absence or superabundance of this secretion in any way disturbs the functions of the intestinal tube. It would be a curious fact to prove in serous or mucous diarrhœa of infants, that the secretion of the pancreas united with that of the follicular apparatus of the intestines, to form the abundant and liquid nature of the stools.

CHAPTER IV.

DISEASES OF THE URINARY APPARATUS.

ART. 1.—Development.

THIS apparatus comprises the renal capsules, kidneys, ureters, bladder, urachus and urethra.

At two months the renal capsules begin to be distinct in the embryo; they are even larger and heavier than the kidneys; but their size gradually diminishes, and the kidneys, on the contrary, become more voluminous, so that at birth the kidneys are three times the bulk of the capsules. They contain, at first, a viscid fluid, which almost entirely fills them; but this fluid being, by degrees, reabsorbed, leaves nothing but a thick brown layer spread over the internal surface of the capsule; when, therefore, the renal capsules of a young infant are examined, there is always found in them the soft brown substance just alluded to, and which presents great variety in appearance. Sometimes it is of the color of chocolate; sometimes, on the contrary, it resembles cerebral substance mixed with blood. It is often found so white and soft as to be liable to be mistaken for pus. The substance does not melt by heat, nor will it grease silk paper, and appears to be rather of a fibrous nature, analogous to that of the blood, rather than a serous, mucous, or adipose fluid. We must be careful not to consider it as the result of a morbid secretion, or of a disorganization of tissue. The external appearance of these organs is of a reddish yellow or light brown; they are usually rugous or wrinkled; they are so tender as to be easily

torn. This consistence, therefore, ought not to be taken for a morbid softening. With Meckel, I am of opinion that they have no cavity; at least it is hardly a cavity which contains the semi-fluid matter throughout the interior of these capsules.

The kidneys, which do not appear until after the renal capsules—that is to say, between the second and third month—are at first composed of a number of hollow lobules communicating freely among themselves, and which are connected by a tissue very easily separated. The lobules, approaching afterwards more closely, are confounded, as it were, one with the other, and become less numerous; the openings between them are smaller, presenting very shortly a small hole which opens into the common reservoir, the pelvis. During the formation of this union of the lobules of the kidney, the cortical substance forms gradually; it is very evident at six months. It is to be remarked that these lobules secrete interiorly, and at an early period, a white serous fluid which distends them, but which is forced out in proportion as the cortical substance forms, the thickness of the walls of the lobules increases, and their cavities diminish; it is probable that this fluid flows into the pelvis of the kidney, and thence into ureters and bladder.

The bladder exists at a very early day; it appears at first under the form of a small distinct pouch, when the kidneys are scarcely formed. At this time it is a kind of continuation of the urachus, which, from the very first formation of the embryo, is large and distinct towards the umbilical cord, and afterwards diminishes progressively, and becomes obliterated to such a degree that anatomists, who, without doubt, observed it only at the period of birth, have denied its existence as a canal.

The ureters and urethra, which are appendages to the different hollow organs just examined, are found as soon as these organs and these canals enlarge, which enlargement occurs in proportion to the growth of the infant.

Malformations.—Malformations of the urinary apparatus frequently appear in infants. As this system is composed of several parts closely united together both by their anatomical relations and their functions, malformation of one of these parts is often connected with a deformity of some of the others. Thus it is that the kidneys are often the seat of organic deviations which

result from congenital malformations of the ureters, bladder, or urethra. We shall hereafter give one example of this. The primitive arrangement of the constituent parts of the organ sufficiently explains the congenital malformations.

I have already remarked that the kidneys were composed primitively of several lobules, on the internal surface of which is secreted a fluid which flows through the ureters into the bladder; but if the ureter presents an interruption or an obliteration of its canal, this fluid then remains in the lobule, distends, and it becomes vesicular, opposes the free development of the cortical substance, and in place of a kidney, on opening the dead body, a mass of transparent vesicles is found, irregularly agglomerated with each other, communicating more or less directly with the pelvis of the kidney, constituting a true congenital encysted dropsy, as will be seen in the following case.

CASE LIII.—*Congenital malformation of the kidney, obliteration of the ureter.*—Jules Martin, aged four days, entered the infirmary. He was strong; the integuments highly colored; at the lumbar region there existed a round tumor, soft to the touch, exhibiting at the centre a red excoriation, and at the circumference a hard, red, and irregular ring. This child remained at the infirmary for one month; during this time he became thin, and insensibly wasted away; there also existed at first vomiting and diarrhœa; the cry was feeble, and the circulation very slow; he died on the 1st of March. On the post mortem examination, there was found a considerable effusion of serosity in the lateral ventricles, through the extent of the spine, and in the tumor which existed in the lumbar region at the spinous processes of the last lumbar and first sacral vertebræ. There was nothing remarkable in the digestive apparatus, but the urinary system presented the following arrangement.

The left kidney consisted of a mass of the size of a goose's egg, of semitransparent lobules, irregularly agglomerated, forming several small cysts filled with a white inodorous fluid. These cysts communicated freely with one another; those nearest to the pelvis opened into this reservoir, which itself was filled with a fluid resembling that in the cysts. The kidneys retained no trace of their natural texture; yet towards the fissure their existed a layer of cellular tissue of a tolerable thickness, and as if condensed. It was in this tissue that the renal artery and vein terminated, and were obliterated. I searched in vain for the connection of the ureter with the

pelvis; the latter formed a true cul-de-sac. The ureters were well developed near the bladder, in which they opened as usual; but in ascending towards the kidneys they were observed to degenerate into two small thin cords, bifurcated and without any perforation, and near the pelvis these filaments became quite numerous, and were applied to the kidneys in the form of a goose's foot.

The right kidney was more developed than usual; the bladder slightly dilated, contained a little turbid urine, in which was found a large quantity of gravel as fine as sand; the lungs were slightly gorged with blood; the fœtal openings were obliterated.

This encysted dropsy of the kidneys was remarkable by reason of its coexistence with an imperforation and obliteration of the ureter. This case furnishes an instance of double malformation of the urinary apparatus, but the one appears to be the result of the other, and I am of opinion that renal dropsy is the effect of a retention of the fluid that has not found an outlet neither by the pelvis or ureters. We ought also to note the presence of gravel in the urine in this case.

When the urine is obstructed in its course at any other part of the urinary passages, it is easily conceived that the parts above the obliteration will present a dilatation analogous to that we have just been considering. The following observation is in point.

CASE LIV.—In dissecting the body of a male infant, born dead, which M. Delpech, physician at Paris, sent to M. Baron on the 10th of June, 1826, I made the following observations. The head was small in size; the limbs very thin; the integuments flabby and slightly purple; the abdomen excessively distended, formed a round projecting tumor, presenting the appearance of a kind of circular cone, the umbilicus forming the apex. The insertion of the umbilical cord was very large. A very evident fluctuation was felt in this tumor. In every other respect the body exhibited all the characters of a child born at the full term.

On opening the body, a vast pouch was seen filling all the abdominal cavity, and the intestines were crowded by it backward and upward. On the anterior lateral part of this pouch, the vesiculæ seminales were found attached, and at the inferior lateral part of this cyst, the vassa deferentia appeared, together with the testicles. Lastly, near the summit of this cyst, and directly between the two

vesiculæ seminales, was seen the rectum, very large, and distended by a large quantity of meconium, adhering solidly to the walls of this voluminous pouch, and obliterated; which was discovered to be the bladder, and was also enormously distended by a white fluid, which did not alter the color of litmus paper; this fluid contained some white ropy mucosity, and the internal surface of the bladder was covered with a layer of adherent mucus. The interior orifice of the urethra did not exist; on examining the canal, I was only able to pass the stylet of a female catheter about half an inch, and I discovered, on dissection, that the passage became gradually narrowed from the extremity of the penis, and finally became obliterated, terminating in a filament, lost, as it were, in the cellular tissue of the perinæum. I was unable to discover the prostrate gland; at least I could not consider a sort of reddish tissue, adherent to the bladder behind the insertion of the rectum, as this organ. The openings of the ureters into the bladder were perfect; their diameter was large and insensibly increasing to the kidney, and on each side was nearly as large as a hen's egg, exhibiting the same lobular structure as the preceding case. Yet the lobules were smaller, less transparent, and were in part covered with the cortical substance, but the infundibuli and pelvis were much larger and more distended than natural. A white inodorous fluid filled the vesicular lobules, which had a free communication with each other, and opened into the pelvis; the urachus existed only as a small obliterated conduit.

There was no anus, and the rectum, examined interiorly, presented a complete cul-de-sac, closely adherent to the bladder. There was nothing remarkable in the other organs.

In this child it appears that the obliteration of the urethra caused the dropsy of the bladder, and the latter, the hydropic affection of the kidneys, the normal development of which was hindered or even suspended. The bladder, in distending and in acquiring the size which it exhibited, appeared to have moved from its situation forward and upward; so that the base was found elevated, and drawing with it every part that was adherent inferiorly; they were in this way drawn out of their natural situation; hence the situation of the vesiculæ seminales and the rectum at the superior part, and the opening of the ureters at the lateral and anterior part. Thus several disorders resulted from an original malformation—involving not only the portions of

the same apparatus, but likewise organs which had only the relation of contiguity with these parts.

This case, as well as the preceding, will serve to prove that the excretions of the fœtus, at least those of the urinary organs, are, in the normal condition, rejected from the body, and probably are mixed with the waters of the amnios, since it appears that when any obstacle occurs to the passage of this fluid, it reflows into the reservoirs, and distends them excessively, in the same manner as is observed in adults who are affected with a stricture of the urethra, or paralysis of the bladder. This remark ought to have a place in the history of embryology.

The urinary passages may also present other congenital malformations, for, as M. Meckel observes, the urinary apparatus is one of those which presents the greatest anomalies. The kidneys are sometimes absent, or if there is but one, it is generally found on the median line, and close to the vertebral column. They are more or less voluminous; their lobules are sometimes widely separated: their situation, likewise varies, the effect of different causes; thus, for instance, they are drawn below or crowded towards the diaphragm, in consequence of adhesion which they may contract with the surrounding parts.

Absence, imperfection, occlusion, or plurality of the ureters, have been pointed out in the preceding observations.

In addition to the distension and displacement of the bladder, this organ sometimes exhibits a congenital malformation, of which Chaussier, Duncan, and other authors have given instances. I allude to extrusion of the bladder. The anterior portion is absent; at the same time there exists a division of the abdominal parietes, or a separation of the pubis opposite the bladder, so that this organ exhibits, on the outside of the abdomen, the internal surface of its posterior wall, which is red and studded with mamillary protuberances, and the orifice of the ureters are often seen, from which the urine continually issues. This malformation is met with not only in males, as Duncan asserts,* but is also found to exist in females.

Meckel observes that the bladder has been seen bifurcated or

* *Med. and Surg. Journal*, 1805, Edinburgh.

formed into several sacs.* These malformations are so much the more dangerous in young infants, as they offer a greater obstacle to the course of the urine.

The urethra may be either more or less completely obliterated, or may present only a stricture of its canal. The orifice may be met with in any portion of the inferior part of the penis instead of the glans. This malformation has received the name of hypospadias. In such a case, the glans is almost always deformed; it is, as it were, curved downward, so that the urine generally falls between the legs, instead of being thrown forwards.

When a child is born with an imperforate urethra, it will be necessary to form an artificial opening, either at the extremity of the penis, if the passage runs as far, or at any other part of the penis; for it is much better to establish a hypospadias, than to abandon the child to death, which must certainly ensue from a suspension of the course of the urine. The existence and length of the canal may be ascertained by the feeling of fluctuation which is experienced on moving the fingers along the under part of the penis. If the abdomen is distended by the development of the bladder, and should it appear impossible to open the urethra, the puncture of the bladder ought to be attempted, either above the pubis or through the rectum. The latter method is perhaps the best; it will succeed in prolonging the days of the child, particularly if the opening between the bladder and rectum is maintained, because the urine may thereby have a constant outlet by this organ. In every instance these curative measures can have but a temporary efficacy, and will not prevent the child from sinking, sooner or later, under this serious imperfection.

DISEASES OF THE URINARY APPARATUS.

It is probable that, during the intra-uterine life, both the kidneys and bladder may become inflamed, but it is very difficult, particularly with respect to the kidneys, to prove the existence of this inflammation in young infants; indeed the kidneys may be more or less colored, in proportion to the abundance or ab-

* S. A. Ehrlich, *Chirurgische Beobachtungen*, v. 2, p. 123.

sence of blood in their tissue. I have often observed, on the surface of the kidneys of newly born children, ecchymoses of greater or less extent, attributable to the effusion of blood beneath their proper covering; often, also, there are seen red spots on the papillæ, frequently of so great a size as to be regarded as true petechiæ.

There is a very remarkable alteration of color, which is seen in infants affected with icterus; shining yellow striæ are observed to spread in rays from the summit to the base of the papillæ, which, without doubt, are owing to the coloring of the serosity between the fibres of the papillary substance. These colored striæ are uniformly in one direction; they must not be regarded as the result of any particular alteration in the tissue of the kidneys, but as the effect of a remote cause which produces jaundice. I once saw the cortical separated from the papillary substance by a yellow line, analogous to that of which I have just spoken: the papillæ appeared as if enveloped by a festooned line.

I have several times found the kidneys in young infants so soft that they were torn upon the least effort.

It would seem as if calculous nephritis might be developed even during intra-uterine life; such was in truth the fact with the child mentioned in case LIII., in whose bladder a quantity of gravel was found. M. Denis has often found gravel in the urinary passages and in the urine of young infants. I have also frequently found them, but never saw calculi, properly so called; still I think it not impossible for them to exist.

The bladder in new-born children is usually small and contracted; it is scarcely elevated above the superior strait of the pelvis; its internal surface is remarkable for its white, satin-like appearance, entirely different from that of other abdominal organs, which are almost always more or less injected at the period of birth. Once only I found petechiæ; but they existed also in other parts of the body at the same time.

After birth, the kidneys and bladder sometimes become inflamed, but phlegmasiæ of these organs are much more rare in the infant at the breast than those of other organs.

The symptoms which Willan and Underwood have attributed to ischuria renales in children appear to me to be those of a true

nephritis, at least we must so infer from the symptoms described, and the success of the treatment employed. If infants have died, as Underwood says, without any evidence of pain or any particular uneasiness, it shows that the most serious inflammations may arise without giving evidence of any well-marked reaction.

When the suspension of urine arises from an affection of the kidneys, in consequence of which their functions are suspended, although no urine passes, yet the bladder does not become distended, so that the fluid is not really secreted in so great a quantity as in the natural state.

I have not traced with great accuracy the symptoms of cystitis in infants at the breast, as I have not been able to observe them with sufficient care, either because they have not been very evident in the young subjects submitted to my notice, or have been concealed by other symptoms; but I have often found the bladder inflamed in opening the bodies of children at a different age. This inflammation was characterized by an intense redness, a well-marked tumefaction of the internal membrane, which was torn and separated in shreds with the greatest facility. I observed particularly in three infants aged, one fifteen days, another two months, and the third four months, where the bladder was distended by a large quantity of urine, a very high inflammation of the neck of the bladder, which was red and very much swelled, which led me to believe that these children had been affected with cystitis, and following it a retention of urine to which they succumbed. The greatest care must therefore be observed in studying the causes of retention of urine in infants, in order to render the necessary assistance for its removal. We should endeavor to distinguish retention produced by cystitis, from that which has its cause in the paralysis of the bladder arising from the existence of an acute or chronic affection of the cerebro-spinal apparatus.

It would appear from the remarks and observations of Morton, that infants may be affected with diabetes mellitis, a disease characterized, he says, by a rapid emaciation, an abundant diarrhœa, an urgent thirst, and a great discharge of urine, which, as in adults, possesses a saccharine quality.

Catarrh of the bladder is very rare in infants at the breast;

it is more frequent in children more advanced in age, whether it be idiopathic, or whether it be caused by the presence of a calculus in the bladder.

The treatment of these various affections is very easy: thus, acute cystitis which may be recognised by a painful tension of the hypogastrium, and suspension of urine, will be advantageously treated by the application of one or two leeches to the perinæum, and the use of warm baths and emollient cataplasms to the abdomen. When there exists a paralysis of the bladder, recourse must be had to the catheter, together with such measures as will be necessary to meet the cerebral affection of which the paralysis is the effect; and lastly, if diabetes as described by Morton be recognised, the treatment recommended by that celebrated practitioner should be adopted. The method of treating a child that he cured, consisted of a diet of milk, to which the patient was strictly kept from the commencement of the disease, and the only drink that was allowed to quench the thirst with which it was incessantly tormented, was a mixture of honey and the ferruginous water of Islington.

New-born children are sometimes affected with retention of urine, arising neither from inflammation nor paralysis of the bladder; they are often two or more days without passing any urine. In a case of this kind, when we are satisfied that the natural passage exists, it will be necessary to place the child in a warm bath, and to apply a poultice to the abdomen, or, as is advised by Underwood, a bladder partially filled with warm water.*

When infants are affected with gravel or urinary calculi, it will be difficult to adopt the course of treatment necessary for such disorders; how, indeed, can young children, whose sole nourishment is milk, be submitted to a watery vegetable diet, as recommended by M. Magendie? This disease is doubtless very dangerous at this early age, and we cannot expect to remove the cause, but in proportion as the advance of age enables us to vary, modify, and select their food. Nevertheless, the nurse should be kept from the use of fat meats, and such as abound in azote, and use exclusively vegetable diet.

* See Appendix.

CHAPTER V.

PERITONITIS.

INFLAMMATION of the peritoneum is more common than is generally believed; and, not only is it developed after birth under the influence of the exciting causes to which the child is subjected, but it may likewise exist during the intra-uterine life, as will be seen in the following instances.

Congenital peritonitis.—I have seen in the dead body of two children, that died, the one eighteen hours, and the other twenty-four hours after birth, old and very firm adhesions between the different convolutions of the intestines, and in one of them the convex surface of the liver adhered firmly to the interior walls of the abdomen. These accidental adhesions must be considered as the result of peritonitis developed during intra-uterine life, and which had passed through its different stages before birth. One of these children was thin, small, and very pale; but the other exhibited the usual appearance of infants at birth.

Acute peritonitis in children has to appearance often been brought with them from birth. M. Dugès, in his essay on the diseases of children, where will be found a very interesting chapter devoted to the history of peritonitis of new-born children, has reported the case of a child born on the 9th of February, 1821, at the Maternité, between the seventh and eighth month, well-formed, about sixteen inches in length, weighing three pounds and a half. It was affected with a general œdema; the abdomen was tense; and although the child had respired, cried, and lived for three hours, it had passed no meconium; yet it had received and passed a tepid enema. The post mortem examination was made on the ensuing day, in the presence of professor Chaussier. "All the abdominal viscera," says M. Dugès, "were agglutinated by yellow concrete albumen. False membranes were found attached to the liver, spleen, bladder, &c. The epiphora was adherent to the intestines; the latter were joined together in a bundle, and were yellow, hard, and thick; their tissue appeared to be mixed with concrete albumen; and they contained a yellow frothy mucus, etc."

This infant was a first child; the mother twenty-two years of age, and in good health, having been subject only to chilblains, and sometimes to pimples on the hands.*

I have seen peritonitis to the same extent in three infants that died a short time after birth, and who were all quite vigorous; the post mortem examination alone revealed the cause of their death. In one of them, sero-purulent effusion was very abundant; the intestines were very red exteriorly, and had already begun to contract adhesions.

We can easily believe that the recent adhesions of the peritoneum in the case cited by M. Dugès, and in the last instances which I have given, were indications of the existence of acute phlegmasia, developed either in the latter period of pregnancy or during birth: it is not the same, however, with chronic peritonitis accompanied by old and firm adhesions, of which I have spoken, and which has passed through its several stages in the uterus. But what can be the exciting cause of this inflammation? It must be transmitted from the mother to the child; if otherwise, in what way can it be accounted for?

Peritonitis developed after birth.—From the time children are subjected to the stimulating causes which surround us, their influence may to a greater or less extent produce irritation and inflammation in their organs, which are not less sensible than our own; we ought not, therefore, to be surprised at the existence of peritonitis in young infants.

It appears either in an acute or chronic state, of which I will give instances.

CASE LV.—*Acute peritonitis.*—Alexis Sonnecourt entered the infirmary on the 13th of February, aged fourteen days. This child possessed some strength; but in the last two days he became pale, vomited all the drinks, was affected with an infiltration of the lower limbs, and the expression of the face indicated great distress. He was continually restless; his abdomen was tympanitic, and formed a point towards the navel; it was hard, and very painful to the touch, for immediately upon pressing it the child cried, became red in the face, and respired with the greatest difficulty. The thorax

* *Recherches sur les maladies les plus importantes et les moins connues des enfans nouveau-nés.* Paris, 1821.

resounded throughout its whole extent; the skin was dry and burning; the pulse could not be distinguished at the wrist, and the beating of the heart was very obscure through the stethoscope; the cry was small, feeble, acute, and scarcely to be heard; there were no alvine evacuations. (*Diet, sweetened water, cataplasm to the abdomen, bath.*) He died on the night of the thirteenth. On examining the body on the following day, the mouth, œsophagus, and stomach were found healthy. The intestines were distended by a great quantity of gas; the peritoneum presented no redness in the different parts of its surface; but there existed recent and firm adhesions between the convolutions of the intestines, a thick pseudo-membranous layer on the mesentery, and nearly two ounces of a sero-purulent liquid effused in the cavity of the abdomen. The brain and circulatory apparatus were healthy.

Among the symptoms of this peritonitis, we have particularly remarked the painful distension of the abdomen, the absence of diarrhœa, the extreme smallness of the pulse, and the painful expression of the physiognomy. The anatomical lesions were here of a nature too evident to admit of a doubt as to the existence of peritonitis.

CASE LVI.—Chronic peritonitis.—Josephine Perrine, aged ten months, of a good size, but thin and pale; had already cut the two incisor teeth of the lower jaw; was suddenly seized with dyspnœa. This child, usually lively, had become morose and fretful. She entered the infirmary on the 22d of January, 1826. The abdomen was tympanitic; the respiration a little difficult, and was indistinctly heard at the upper part of the right side of the chest; the tongue was dry, pulse small, skin burning; she was affected with diarrhœa consisting of green and mucous fœces. (*Syrup of gum, cataplasm to the abdomen, milk and water.*) On the twenty-third, the diarrhœa became more light-colored; on the twenty-fourth, the same general symptoms, but without fever; tension of the abdomen, facies hippocratica, forehead wrinkled. On the twenty-sixth, deglutition difficult; retching whenever drinks were given; cry feeble. The isthmus of the fauces appeared of a bright red. Death took place on the morning of the twenty-seventh.

Post mortem examination.—Body considerably emaciated; general paleness of the integuments; nearly two ounces of yellow serosity was found in the abdomen. Numerous and firm adhesions ex

isted between the transverse portion of the colon and the great curvature of the stomach. Some of the convolutions of the small intestines were likewise adherent, but in a less solid manner. The mucous membrane of the stomach was of a pale rose-color; that of the small intestines was covered with red striæ, and a number of slate-colored spots existed in the whole length of the colon. The superior and inferior maxillary bones were so soft and spongy, that they could be cut as easily as cartilage; the gums were not inflamed; the brain contained a quantity of citron-colored serosity in the lateral ventricles; the substance of the brain was very much injected; the right lung was engorged.

It appears to me to be very difficult to have made a correct diagnosis of this peritonitis, which, in consequence of its chronic state, presented but slightly marked characters, and was besides concealed by the intestinal inflammation with which it was complicated. The dyspnœa was perhaps the result of the effusion, which, in the abdomen, would impede the movements of the diaphragm, particularly when the abdominal cavity was compressed with the hand or the child's clothes, for the lungs exhibited no serious lesion that could explain the disordered respiration with which the child had been distressed.

M. Dugès considers constipation as one of the causes of peritonitis in young infants. In support of this opinion, he cites some very striking facts; but besides the fact that constipation is more often the effect than the cause of peritoneal inflammation, since it does not supervene until after the commencement of this phlegmasia,—how does it happen that the child can be affected with this disease in the womb, when constipation is, without doubt, as it appears after birth, the result of a disturbance of the digestive functions? Obliteration of the rectum and internal strangulation of the intestines, may produce this disease, of which M. Legouais and M. Dugès have seen examples; but these accidents may also arise without inflaming the peritoneum, as we have seen in the cases already reported.

It is very difficult, therefore, to explain the causes of peritonitis in infants at the breast. There is one circumstance very remarkable in this disease, and observed by M. Dugès; it is, that children affected with it were not born of mothers suffering from puerperal peritonitis.

The symptoms peculiar to peritonitis are, tension of the abdomen, which rises in a point towards the umbilicus, restlessness, pain, indicated by a pinched face and the increasing cries of the child, vomiting, eructation, constipation, and lastly, a general sinking and smallness of the pulse. Such are the symptoms that characterize peritonitis, and which require the closest attention and tact on the part of the physician to distinguish it from phlegmasia of the intestinal tube, with which it may be complicated and confounded.

Peritonitis may be distinguished from pleurisy by the full sound of the thorax. Dyspnœa, as we have seen in case LV, does not always indicate an affection of the lungs; it may arise from a tympanitic state of the abdomen and the labored movement of the diaphragm; and the abdominal pains being constant, differ from those caused by a spasm of the bowels, and their distension with gas, for in the latter case these colic pains are almost always remittent, and cease with the evacuation of gas. The prognosis of peritonitis in infants is always unfavorable.

Treatment.—The treatment should be commenced by a suspension of sucking; one or two leeches should then be applied on the abdomen, not far from the umbilicus, and the child placed in a warm marshmallows bath, and poultices of flaxseed applied to the belly; it may also be covered with a little oil of almonds, and oil of chamomile, as recommended by M. Chaussier.* From two to three grains of calomel ought then to be given, and a few spoonfuls of the syrup of succory, or an injection of castor oil, or honey of mercury, to procure some fecal discharge, and thereby establish a point of revulsion on the intestines; but before having recourse to these means, we ought to be well assured that we have, in some degree, overcome the acute inflammatory symptoms, and that there exists no enteritis.

When the patient is convalescent, we should return gradually to the use of a tonic regimen suited to the age of the child, who ought not to be returned to the breast until after having been nourished for some time with cows' or goats' milk, diluted with a decoction of oatmeal. The feet must be kept warm, and the

* Dugès, *loc. cit.*, p. 42.

body covered with flannel applied next to the skin ; this kind of permanent irritation is very necessary in convalescence from abdominal phlegmasiæ.

CHAPTER VI.

ASCITES.

It is not uncommon to find in the abdomen of a child that has perished slowly from chronic phlegmasia, a greater or less quantity of citron-colored serosity, and which is unaccompanied by any lesion or morbid production capable of revealing the existence of an actual inflammation of the peritoneum. The quantity of this effusion varies from one to three and four ounces. Where this is found, the children are generally pale, thin, and extremely feeble ; the inferior extremities are almost always œdematous, and the digestive passages, although sometimes inflamed, are usually colorless or softened. This affection is more frequent after the first year, but is sometimes observed in very young infants. Infants at birth have been affected with true dropsy. An instance of this is found in the journal of medicine, pharmacy, and surgery of Professor Roux.

A woman of Charleville, aged thirty years, having fallen and injured herself on the abdomen during her pregnancy, experienced, on rising, a general movement about the lumbar and hypogastric regions ; she was soon affected with strangury. About a month afterwards, labor pains began to be felt, but the labor was very difficult on account of the great size of the bladder, which it became necessary to puncture. About six pints of fluid were discharged by the canula, and four by the natural passage : she was delivered of a dead child. Upon opening the body, nearly a pint of water was found in the abdomen, thorax, and other parts ; and the cellular tissue was the seat of a general infiltration. Every part of the child was well-formed, and there did not appear any disposition to mortification.*

**Journal de Médecine, Chirurg. et Pharm.*, par A. Roux, t. 17. p. 180.

This case is interesting, inasmuch as it presents an instance of congenital dropsy, and also with reference to the intimate connection which existed between the strangury, the retention of a large quantity of urine in the bladder of the mother, and the hydropic affection of the child.*

In order to adopt a rational course of treatment in cases of ascites of newly born children, we ought to refer directly to the causes which produce it, and which appear to continue its existence.

CHAPTER VII.

HERNIAS OF THE ABDOMEN.

CONGENITAL hernias of the abdomen may occur at any of the natural openings in the abdominal parietes, or they may be the result of an imperfection, by which spaces of greater or less

* Dr. Ollivier (of Angers) has reported a case of a species of congenital dropsy, of which there does not exist, at this time, another instance. The serosity was contained in the cavity of the gastro-colic epiploon. The following are the details of this case, which are recorded in the *Archiv. gén. de méd.*, t. 8, p. 383.

"A woman whose health had been invariably good, was confined at the eighth month with a dead child; it was well-formed, possessing all the characters of a fœtus whose development had proceeded with regularity. I was struck with the great size of the abdomen, the walls of which were so thin as to allow of the transparent fluid with which it was filled to be perceived. On making an incision through the integuments, several spoonfuls of transparent yellow serosity flowed out; the peritoneum was white and without any trace of injection. The cavity of the abdomen was entirely filled with a transparent tumor, formed by the great omentum, the laminae of which were widely separated by a yellow, limpid, serous fluid contained in their folds, in the middle of which floated two large albuminous flakes. The surface of the tumor was of an irregular form, caused by the vessels which crossed the lamina of the epiploon, and forming several irregular ridges. In the posterior fold of the epiploon there existed a slight opacity; the rest of this membrane was of usual transparency. The hiatus of Winslow was open, and the small quantity of fluid enclosed in the cavity of the peritoneum, had probably flowed out by that opening. None of the other abdominal organs exhibited any alteration."

Do not the preceding details tend to prove that this dropsy was the result of epiploitis, without any participation of the rest of the peritoneum in this circumscribed inflammation?

extent are left, through which the organs enclosed in the abdomen escape.

Umbilical hernia.—We have seen that, in the beginning of the foetal existence, the intestinal tube is almost entirely situated at the base of the umbilical cord, which, by growing in breadth, forms the anterior part of the parietes of the abdomen; in proportion as the child advances in age, the base of the cord retires, the intestinal convolutions enter the cavity which is henceforth to contain them, and an aponeurotic ring surrounds and contracts the base of the cord, which contains at birth nothing more than the urachus and the umbilical vessels. But if this part of the cord remains large, and continues to lodge some of the convolutions of the intestines, there is formed a sort of round or conical pouch or sac, the summit of which corresponds with the implantation of the cord; the base, to the circumference of the aponeurotic ring already spoken of, and which is then much larger than it usually is, when in a natural state; the skin and cellular tissue more or less condensed, together with the peritoneum, form a triple coat to this hernial sac, where are usually lodged one or more convolutions of the small intestines. When a child presents this infirmity at birth, care must be taken, in tying the cord, not to include the protruding intestine in the ligature; but it most often happens that it is not until the end of some days that the hernia is first perceived, because the intestines are pushed towards the umbilicus, escape through the opening and project from the umbilicus, when they are distended with aliment, and are crowded downward by the contractions of the diaphragm during respiration and the act of crying. Thus, although hernia may not have been very apparent at birth, still it is not the less congenital, because the disposition of parts which constitute it existed at that period. At other times, hernia shows itself fully formed as soon as the child is born.

In either case it will be necessary to attempt the removal of the affection. Two methods of doing this are recommended by authors—ligature and compression.

The ligature formerly in use, and described by Celsus, has been revived by Desault. This celebrated surgeon tied the base of the tumor, which, being thus compressed and narrowed, became the seat of adhesive inflammation, and in this manner the

umbilical opening was closed, and an adhesion of the sides of the peritoneal sac effected.*

This method, most successful in appearance at the time of the operation than in its results, has been disapproved of by most modern surgeons, who have abandoned it from having found that a great number of children operated on by Desault, had experienced a relapse; what, therefore, this celebrated surgeon regarded as a radical cure, was but a temporary relief.†

Compression, then, is the method most generally adopted at the present day, and if its success be slower, it is more permanent. It is applied by fixing an appropriate bandage over the umbilicus; or we may find it only necessary in young infants, where the cord has fallen off, to use a graduated compress, kept in its place by a bandage around the body; or, in order to maintain compression, an elastic belt might be found useful. In proportion as the child advances in age, the umbilical opening contracts, as the intestines acquire too great a volume to pass beyond it.

Congenital inguinal hernia.—The testicles, in passing out of the abdomen of the fœtus through the abdominal ring, carry with them the peritoneum as a kind of envelope, at first partial, but afterwards more general, and which subsequently closes up over the organ so as to form a sac, without any communication with the abdomen. But if, instead of closing, the sac remains freely open, a doubling of the intestine or a portion of the omentum may descend, producing congenital inguinal hernia, in which the intestine is in contact with the testicle, and even sometimes adheres to it.

This species of hernia does not always exist at the period of birth; often it does not manifest itself until some time after, following the efforts that attend painful respiration or crying; but it is necessary to its existence that the child be born with the peculiar disposition of parts which we have just described between the testicle, tunica vaginalis, and the communication more or less free between it and the abdomen. This communication may exist without causing hernia, an instance of which is given by Hesselbach.‡

* Bichat, *Œuvres chirurgicales de Desault*, t. 2, p. 315.

† Richerand, *Nosographie chirurgicale*, t. 2, p. 453.

‡ *Méd. chir., Zeitung*, 1819, p. 110.

It often happens that the testicle, at the period of birth, has not descended into the scrotum: it may be at the ring, either on the point of passing, or may have just passed, forming a round tumor of some hardness, which must not be mistaken for a hernia. There can be no certainty that inguinal hernia exists in young infants, until the testicle has descended into the scrotum. Again, we must be cautious against mistaking the fold of intestine for the testicle, and *vice versâ*. This error appears to be possible, since Pott has seen, in very young children, a portion of the intestine or omentum descend to the bottom of the sac, whilst the testicle was still at the ring, or even in the abdomen.*

All hernias occurring in young infants are not congenital, for Mr. Lawrence has seen an ordinary inguinal hernia which became strangulated in a child of fourteen months.† I shall not enter into all the anatomical details appertaining to the history of congenital inguinal hernias; but will refer to those works especially devoted to this subject for further information.

When a child is born with inguinal hernia, or when it appears some time after birth, it will be necessary, in the first place, to reduce it, and to apply a temporary bandage, but slightly compressive, often changing it to prevent the irritation of the skin at a point which perhaps may be continually soiled with alvine evacuations, using a permanent bandage so soon as the age of the child will allow of its use. In every instance we ought to be positively assured that the testicle is in the scrotum, before using compression at the ring, and that the fluid which the sac sometimes contains is returned to the abdomen.

If the hernia become inflamed, of which we may satisfy ourselves by the tumefaction and pain, it will be necessary to apply a few leeches, and a poultice, using a warm bath at the same time.

From what has been said in relation to the formation of inguinal hernia, evidently caused by the descent of the testicle into the scrotum, we might conclude that congenital hernia is only to be found in boys; yet I once saw it in a little girl. Before explaining how this hernia is caused, I will relate the case.

CASE LVII.—*Congenital inguinal hernia, formed by the ovarium.*—Josephine Romer, aged seventeen days, entered the infirmary

* Cooper's *Surgical Diet.*

† Lawrence on *ruptures*, p. 65.

on the 12th of September. She was strong, and appeared to possess a good constitution; the abdomen was a little tense; there existed at the left inguinal region a round tumor about the size of a filbert, somewhat hard to the touch, and could neither be returned to the abdomen nor diminished by pressure, nor did its size augment on the crying of the child. It was directed obliquely towards the labium of the same side, but did not quite reach it. When the situation of the tumor was considered, the conviction could hardly be resisted that it was a congenital inguinal hernia, yet the sex of the child forbid this supposition. Our judgment was therefore suspended until, at the end of twenty-six days, the death of the child from pneumonia enabled us to ascertain, by dissection, the nature of this tumor.

The body was much reduced by marasmus; there existed an evident injection of the intestinal tube; a slight inflammation of the follicles of the large intestines, and a well-marked hepatization of the right lung at its inferior lobe and posterior border.

The hernial tumor was formed by the left ovarium, which had descended through the inguinal canal and ring, which was much larger than is usual to find it in girls. The uterus, drawn by the round ligament, and by the ovarium which formed the hernia, had deviated from its natural position, and was inclined towards the left side of the bladder. The left kidney, instead of being found on the level with the other, was drawn downwards by the cellular tissue, with which it was enveloped, and also by a fold of the peritoneum, which was intimately connected with the orifice of the sac; the renal artery and vein had also yielded to this traction, and were elongated and narrowed at the same time; and lastly, the ovarium and the fimbriated extremity of the Fallopian tube, a little reddened and tumefied, were lodged at the bottom of the sac formed by a prolongation of the peritoneum, with which cavity it communicated. There were no convolutions of the intestines adhering to the surrounding parts, and the ovarium of the opposite side was in its usual situation.

Upon carefully examining the round ligament of the uterus on the side on which the hernia existed, I found it much shorter than that of the opposite side, and that it terminated in the labium by an aponeurotic expansion, in place of losing itself in loose filaments, as is usually observed to be the case; from which it would seem that the ligament, shorter and more firmly fixed to the labium, had, in the first place, caused the deviation of the uterus, and afterwards drew with it the ovarium through the inguinal ring. It followed from this abnormal adhesion, that all the moveable parts on the left side of the

abdomen which had connection of continuity or of contiguity with the hernia, were drawn to the side of the hernia, for they were not separated from each other, nor did they follow the abdomen in its enlargement during the development of the fœtus in the uterus. I will return to this subject when considering the diseases of the genital organs.

I have said that other abdominal hernias may result from a default in the development of the walls of this cavity. It is near the umbilicus and on the median line that it is more often observed. The skin at the umbilicus is sometimes wanting, and the base of the cord alone forms the exterior of the sac, enclosing the intestines that had passed through an opening at the umbilicus. Sometimes it happens that the covering is so thin, that the intestine forming the hernia can be seen through the tissue. Mr. Hey, in a similar case, had recourse to the following means to cure this infirmity: having reduced the intestines, he confided to an assistant the compressing of the cord close to the abdomen to prevent the return of the intestines into the hernial sac. "I procured," says he, "some plaster spread on leather cut in circular pieces, and laid upon one another in a conical form. This compress I placed upon the navel, after I had brought the skin on each side of the aperture into contact, and laid one of the lips a little over the other. I then put round the child's abdomen a linen belt, and placed upon the navel a thick circular quilted pad. This bandage kept the intestine securely within the abdomen, and was renewed occasionally. The funis was separated about a week after birth; and at the expiration of a fortnight from that time, the aperture at the navel was so far contracted that the crying of the child did not cause the least protrusion."*

A much greater imperforation in the parietes of the abdomen may occasion considerable displacement of the viscera contained in this cavity. Mellet has reported a case in the *Vandermonde Journal*, of a woman who was delivered of a child where the intestines and the whole of the mesentery had escaped from the abdomen through a round opening, about an inch and a half in diameter, situated in the umbilical region, about two lines from the navel.

* *Dictionary of Practical Surgery*, by Samuel Cooper.

The smallness of this opening, the great volume which the parts presented in consequence of the swelling of the intestines and stomach, and the extreme feebleness of the child, would not allow of any measures being used to effect a reduction. The child was sustained by sweetened wine and water; and although the intestines appeared to be strangulated by this small opening, the fluids given it were observed to pass even to the rectum, since some hours after passing the meconium, the child vomited by stool other liquid matters, which possessed something of the color of wine. The child died in about two hours, and on the following day the disposition of the parts were examined, and the portion which escaped from the opening described, was found to reach even to the thighs. The whole of the stomach, the small intestines, colon,—the extremity of which, where it joins the rectum, re-entered the abdomen through the opening,—the mesentery, the left kidney, the supra-renal capsules of the same side, and the spleen, were found outside of the abdomen, without any membranous envelope; the peritoneum and the omentum were entirely wanting. There was nothing in the interior but the liver, which was prodigiously enlarged, and the right kidney, which occupied its natural place; the left ureter was much larger than the right; there was no pancreas.*

In such a case, I am of opinion that the stricture should be relieved, and the viscera gradually and cautiously returned. The application of a bandage, armed with a pad slightly compressive, would probably assist in obliterating the opening.

This is the proper place for speaking of those accidental tumors enclosing the fragments of another fœtus, and which have been sometimes seen developed in different points of the abdominal cavity; but the consideration of this subject would lead me into details which do not comport with the limits which I have prescribed to this work.†

* Case of a child born with all the contents of the abdomen outside of the cavity, by M. Mellet, surgeon and accoucheur at Chalons, sur. mer. *Journal de méd. chirurg. et pharm.* May, 1756.

† Consult Dupuytren, *Rapport fait à la Société de la Faculté*. Reports of this Society No. 1, p 4. Ad. Lachaise, *de la duplicité monstrueuse par inclusion*. Paris, 1823. C. P. Ollivier, *Mémoire sur la monstruosité par inclusion*, *Archives général de médecine*. t. 15 and 17.—Isid. Geoffroy St. Hilaire, *Hist. des anomalies de*

PROLOPSUS OF THE RECTUM.

Prolopsus of the rectum consists in an unlining, as it were, of the internal membrane of this intestine. As this membrane is soft, and only adheres to the other membranes by loose cellular tissue, it projects externally, and forms at the anus a thick red ring, which is sometimes bloody whenever it is pushed downwards by any cause whatever—such as constipation, or the continual crying of an enfeebled child, or when a large quantity of fœces is passed after an obstinate constipation. It may also be produced by large stools following the administration of a purgative.

I do not know on what reasons Underwood has founded his opinion that this accident is a symptomatic affection of the presence of worms or other irritating matter in the intestines. There really exists no relation between these affections.

Immediately on the protrusion of the rectum, it will be necessary to attempt the return of the ring formed by the mucous membrane; this may be accomplished by pushing the protruded part upwards with the fingers, anointed with cerate or oil, taking the precaution to cause the ring to enter first. The tumor thus reduced may be kept in its position by means of compresses wetted with cold water, and which may be retained in their place with a T bandage. If this disorder should continue, it will be necessary, as the child advances in age, to prevent the prolopsus by supporting the circumference of the anus during the efforts at defecation. Aromatic powders, or astringent lotions, add but little to the mechanical means to which it is necessary to resort in order to support the rectum.

l'organisation chez l'homme et les animaux, 1832, in 8vo. fig.—Serres, *Recherches d'anatomie transcendante et pathologique; theorie des formations organiques appliquée a l'anatomie de la duplicité monstrueuse*. Paris, 1832.

CHAPTER VII.

DISEASES OF THE RESPIRATORY APPARATUS.

In the respiratory apparatus is comprehended the nasal fossæ, larynx, trachea, and lungs.

SECTION I.

DISEASES OF THE NOSE AND NASAL FOSSÆ.

It may create some surprise to see the nasal fossæ classed with the organs of the respiratory apparatus. In man, the nose and the nasal fossæ are but an accessory part, and one not immediately dependent on the respiratory system; they are especially destined to olfaction. In some animals, and particularly among fishes, the nasal fossæ are altogether separated from the respiratory passages; but this is not the case with an infant at birth; it respire very little by the mouth, which is almost always shut, and while sucking, it is essentially necessary that the air penetrate the lungs through the nasal fossæ, since the buccal cavity, applied to the nipple, is continually filled with milk. Besides, without this it would be impossible to prolong the act of sucking for any length of time.

The importance of the functions which the nasal fossæ fulfil, as an organ subsidiary to the respiratory apparatus, is also demonstrated by the seriousness of the diseases which are developed in them. Thus, it appears of more importance to consider the nasal fossæ rather as an organ of respiration than an organ of olfaction in an infant, who cannot enjoy the sense of smell. These considerations will suffice without doubt for our motive in placing the diseases of the nose and nasal fossæ among those of the respiratory organs.

Development and congenital malformations.—During the first period of intra-uterine life, the nose does not exist; the nasal fossæ, which at first communicate with the mouth, separate from it gradually by the approximation and union of the two lateral

parts of the palatine arch. At six weeks or two months, two small holes situated by the side of each other appear above the mouth; these are the commencement of the opening of the nostrils; very soon two slight projections arise above these openings; they are the first rudiments of the alæ of the nose, which arise by degrees, but are very incomplete; for during the whole of the intra-uterine life, it continues quite small and obtuse. Whilst the progress of the formation of the nose is in operation, the nasal fossæ enlarge, particularly in height; they are also a little spread at the bottom, but continue very narrow at the superior part. The sinuses and cornua are formed without leaving any thing but a very narrow space between them; the mucous membrane with which they are covered is very red and thick in the latter period of fœtal life, and it exhibits the same characters at birth. The frontal and maxillary sinuses do not as yet exist; they are not formed until a more advanced period.

We have seen that the holes of the nose do not exist at first; their development may be impeded or suspended, and the child be born with an entire absence of the nose, or with a considerable flatness of this organ, which preserves through life the traces of this primitive formation; but its complete absence usually depends on the absence of the ethmoid bone; the two eyes, united together, are lodged in a cavity commonly situated at the place of the nose. M. de Larue has given in the *Vandermonde Journal*, the case of a monster, of the cyclops order, which presented the following appearance: the size of the head, he observes, was proportioned to that of the body; the forehead was very large, and occupied three fourths of the face; not the slightest trace of a nose could be found; there appeared to be nothing more than an oval opening, situated horizontally at the place where the point of the nose should have been, six lines above the superior alveolar process. Neither the cerebrum nor cerebellum exhibited any thing extraordinary; there was no olfactory nerve, and although the bed of these nerves existed, there was no ethmoid bone nor cribriform plate.*

Sometimes there is found in place of a nose a kind of prolon-

* *Observation sur un monstre cyclope*, by M. de Larue, surgeon and demonstrator of anatomy at Rennes, *Journal de méd. chir. and pharm.*, t. 7, p. 278.

gation, produced without doubt by the remains of the skin which ought to cover the nasal eminence. The nose may be prolonged in such a manner as to form a real proboscis descending below the mouth. I have seen an instance of this deformity preserved by Dr. Garnier of Angers. Without being thus prolonged, the nasal eminence instead of being short and depressed, as is the case in infants at birth, already possessed the full form of an adult's nose, and bore a close resemblance to it: this premature development ought to be regarded as a species of deformity. I have also seen an infant at birth, where the nose possessed the shape known by the name of aquiline. Lastly, there have been examples of bifid noses,*—or without being completely double, showing in a very marked manner, the medium line which separates the two lateral parts of this organ.†

Diseases developed after birth.—In an infant at birth, the pituitary membrane is always very red, and very much engorged, and it possesses besides great irritability; for we often see children sneeze at birth, immediately on the air coming in contact with this part. The membrane also secretes an abundant mucus

* The complete separation of the two portions of the nose may also be produced by the formation of tumors in the nasal fossæ, which date their existence from the earliest period of the formation of the embryo. Dr. Rosata Dimidry has given a very remarkable instance of this. On the 7th of September, 1830, a young woman, of the commune de Vaglie, canton of Brindisi, in the province of Lecce, was delivered of a girl, who exhibited a large-sized fleshy prolongation, extending from the nose over and below the mouth. An attentive examination satisfied Dr. Dimidry, that the nose of this child was bifid, being divided at the base so that the two portions were separated, and between them projected a tumor of the size of a goose's egg, closely adhering to the entire circumference of the nasal opening and the upper lip, before which it descended; afterwards becoming free, it was extended even to the lower lip, thus almost completely closing the opening of the mouth. At the upper part of this abnormal production appeared a nipple-like protuberance, and one of similar shape and appearance at the inferior part contiguous to the lower lip.

Dr. Dimidry ascertained that this tumor interfered with respiration, by the complete closure of the nostrils, and the almost entire closure of the buccal opening; and not doubting but a complete asphyxia would ensue, which would be quickly mortal, he decided to remove the tumor by one stroke of the knife. The dissection of this tumor proved it to be enveloped by a prolongation of skin, and that its tissue had the granulated appearance of a glandular body.

Notwithstanding all the means employed to sustain this child, it could not be accomplished, and it died four hours after the operation. (*Anali di med. et chir. di Napoli*, Septem. 1830.)

† Victor Laroche, *Dissert. inaug.*, p. 50.

at a very early period, and it flows constantly from the nose in some children. Thus, the sanguineous congestion, redness, irritability, and the abundant secretion of the pituitary membrane in young infants, demonstrate the great disposition in this membrane to inflame, and explain the frequency of coryza in newborn children. This disease has attracted the attention of pathologists; and I will endeavor to give an account of the affection.

It may be simple or complicated, with a more or less rapid formation of a membranous concretion throughout the whole extent of the nasal fossæ.

Simple Coryza.—The action of cold, humid air, the chilliness of the extremities, when wetted with the urine, in those infants where there is a great negligence in changing their clothes, exposure to a strong fire, and particularly to the light and heat of the solar rays, are the usual causes of this affection in young infants. When children are taken out for the benefit of the air on the return of spring, it is almost always observed that they sneeze and experience a discharge from the nose, and the promptitude with which insolation acts on the pituitary membrane is greater at this season, because during the winter they are less accustomed to the impression of the sun. This is perhaps the reason why people regard the sun in the month of May as unhealthy. From whatever cause it may arise, whenever the pituitary membrane of infants is inflamed, it presents the following symptoms.

Frequent sneezing is the first sign of this affection. Soon after, mucosity flows from the nostrils, at first ropy and clear, afterwards yellow, and lastly, purulent. The child, who almost always sleeps with its mouth closed, cannot now sleep without keeping it open: the respiration is noisy, and instead of the usual râle, a whistling sound occurs in the nasal fossæ. This sound becomes greater, and the difficulty of respiration increases in proportion as the nasal mucosities become thicker and more abundant. This discharge dries at the orifice of the nostrils, which are more or less closed, and thereby prevents the entrance of air: the restlessness, cries, and the physiognomy of the child express the distress it suffers. If at this time it is placed at the breast, its anxiety and the suffocation increase, it leaves the nip-

ple because unable to exercise suction, as it can only respire by the mouth, which is filled with the nipple and the milk that flows from it; and being thus in a continual state of agitation from the sense of hunger, and the impossibility of satisfying it, soon becomes exhausted by fatigue, pain, and inanition, and quickly perishes, even before arriving at an advanced stage of marasmus. The progress of symptoms is sometimes very rapid, and a young infant may die in three or four days, from this disease; and on this account it is justly regarded as of a most serious character in infants. On the other hand, it is not to be always looked upon as so serious; for the danger of the disease is always proportionate to the degree of tumefaction of the pituitary membrane, and to the abundance, and especially the consistence of the mucosities secreted by the inflamed membrane. When therefore the inflammation is slight, the nasal mucosities are only a little more abundant, clear, and ropy than in the natural state, and the inconvenience of respiration is but slight. In general, coryza is not a dangerous disease when the infant can suck; the danger begins with the difficulty of respiration, and the inability to suck; and all other things being equal, it is more serious in proportion to the tender age of the child.

Coryza with pellicular concretions.—Inflammation of the pituitary membrane sometimes gives rise to the formation of pseudo-membranous concretions which cover the surface of the nasal fossæ. In forty children affected with coryza of greater or less intensity, that were treated at the infirmary of the Institution of the Enfants Trouvés, there were five with the false membranes covering the sinus and the cornua, and adhering more or less closely to the pituitary membrane, which was of a vivid red, thick, and very friable. The formation of these false membranes had been preceded by all the symptoms peculiar to coryza, they were covered with thick mucosities, in the midst of which appeared either the remains, or the pseudo-membranous rudiments. These children had sunk very quickly under the disease, and in only one of them was it possible to make a diagnosis of the presence of the membranous concretion in the nasal fossæ, for the others presented nothing more than the usual signs of a very intense inflammation of these parts. The following is the history of this remarkable case.

CASE LVIII.—*Coryza, with pseudo-membranous concretion.*—Marie Eseril, aged six days, entered the infirmary on the 18th of May. She was small, the integuments were vermilion, pulse natural, abdomen a little tender; the dejections were green and very abundant. (*Gum syrup, rice, emollient cataplasm to the abdomen, milk and water.*) Same condition to the twenty-first, when it was perceived that the child sneezed frequently, and that she swallowed with difficulty the milk that was given her with a spoon; the face was pale, the limbs were not more œdematus; and there supervened a slight ophthalmia, and frequent vomitings of undigested milk. Towards night there occurred an abundant flow of ropy mucosity from the nostrils. On the twenty-second and twenty-third, same condition. On the twenty-fourth, the respiration was much more difficult, and the child slept with her mouth open; the forehead was wrinkled, the alæ of the nose drawn outward, the restlessness, anxiety, and frequent cries, which the feebleness of the child, however, would not allow of their being prolonged, all led to the belief that there existed an obstacle to the free passage of the air in some point of the air passages. (*Same treatment.*) On the twenty-fifth, infiltration and paleness of the face, continuation of the diarrhœa and vomiting, nasal respiration very noisy, accompanied, when the child cried, with a sudden snorting, which terminated the respiratory movement. M. Baron was of opinion that the coryza, which, until then, had produced an abundant secretion of mucosity, had become complicated with the formation of a membranous concretion. This state continued until the twenty-ninth; the child fell into a state of complete marasmus, the nasal respiration was conducted with less noise, but the mucosities, puriform and green, flowed from the nose in great quantities. On the thirty-first, the nasal sound returned; vomiting of mucus matters occurred every moment, and the child, almost unable to respire, and reduced to a state of great feebleness, expired at night.

Upon opening the body, the mouth was found healthy, and the stomach without any mark of disease; two thirds of the small intestines healthy; but there existed in the ileo-cæcal region a very large red patch, with tumefaction and friability of the mucous tissue; the ileo-cæcal valve was so tumefied as only to admit the stylet of a female catheter; the large intestines were perfectly healthy; the liver was pale. In the nasal fossæ was found a white pseudo-membranous concretion, a little projecting by the blood exhaled on its surface. It commenced at the superior part of the glottis, and in-

stead of extending to the trachea, spread towards the sinus and cornua of the nose, which it covered closely and solidly. The mucous membrane beneath it was much tumefied and of a vivid red, and was even bloody in certain places. The right lung was gorged with blood at its posterior border; the brain was healthy.

It is evident that this child died from a coryza, which, at first, simple, and attended only with an increase of a very abundant secretion, was finally complicated with the formation of a pellicular concretion, and that this pellicle, by obstructing the passage of air, gave rise to all the symptoms which had been observed. It is probable that the abundant vomiting was owing to an obstruction at the ileo-cæcal valve, since there was neither œsophagitis nor gastritis.

Coryza may assume a chronic character, and cause the death of the patient by the disorganization which ensues. This was the case in the following instance :

CASE LIX.—*Chronic coryza, inflammatory softening of the pituitary membrane.*—Paul Galon, aged 17 months, had been weaned for some time, entered the infirmary on the 21st of August; he was pale, although he possessed considerable strength; the skin was hot, the pulse natural, the nasal respiration was extremely difficult, the conjunctivæ were slightly injected. (*Gummed marshmallows, pedeluvium, milk and water.*) During the month of March he presented no other symptom than that of an abundant mucous discharge from the nose, a very difficult respiration, and a great tendency to drowsiness; the pulse in general was small and slow, yet it became more frequent towards night. (*Four leeches to the mastoidean region and a blister to the neck.*) This treatment produced a melioration of symptoms, and the respiration became better. On the 3d of April the drowsiness returned; the pulse was frequent and small; paleness universal; skin dry; abdomen tense; respiration difficult, with an abundant flow of mucus from the nostrils, and vomiting. (*Four leeches to the epigastrium, cataplasm to the abdomen, diet.*) On the 4th of April the skin was cooler, the mouth continued dry; there was no vomiting, and the pulse less frequent. On the 6th of April there was a complete disappearance of the gastric symptoms; there existed an abundant flow of nasal mucosity, and the passage of air through the nasal fossæ appeared to be difficult; the upper lip was œdematous. From this time to the fifteenth, the same state con-

tinued; the child did not waste away; the nose and upper lip were continually moistened with mucosity, which was always white and ropy, like the white of an egg. During the month of May the child remained much in the same state; but on the 2d of June a nettle-rash made its appearance, accompanied with a little fever, which, however, disappeared at the end of two days. (*Gummed barley-water, milk and water, diet.*) There was a slight melioration of symptoms, but the coryza continued, and it was for this affection alone that the child remained in the infirmary. The remainder of this month and the commencement of July passed without any thing remarkable occurring; but in the night of the fifteenth, the respiration became difficult, fever arose, and a large quantity of mucosity flowed from the nose and mouth. (*Sweetened decoction of marsh-mallows, diet.*) The debilitated condition of this child would not allow of farther depletion. On the 20th of July the same state continued, general paleness, hectic fever, characterized by the smallness and frequency of the pulse, and a burning heat of the skin; the exacerbation occurring every evening; marasmus made rapid progress; still there was no diarrhœa nor vomiting; the nasal mucosity was very thick and abundant. (*A linctus with a grain of Kermes mineral, blister between the shoulders.*) But slight improvement of symptoms ensued; the child sunk and wasted from day to day; the respiration was noisy, yet the thorax, which, during the course of the disease, was frequently percussed, did not yield a dull sound. On the 10th of August, great oppression supervened, and continually increased, until a considerable flow of mucosity occurred from the nose, the discharge of which was accelerated by sneezing. On the fifteenth, this discharge of mucus from the nose ceased, and the child rallied a little; he was extremely emaciated, yet was not affected with any disorder of the bowels. Emollient drinks, mucilages, and milk and water, formed the treatment at this time, care being taken not to prescribe any nourishment but that of the lightest kind; but the nurse having charge of the ward thinking that a different diet would restore strength to the child, secretly gave him fat soups and broths. On the twenty-fifth of August, during a violent fit of crying, one of the servants, believing it to be an expression of hunger, took the child up and fed him; he immediately showed symptoms of suffocation and died in her arms.

On opening the body the next day, the mouth was found healthy, the œsophagus pale, the stomach very much distended and filled with panado; the mucous membrane of this organ was very soft and red;

the mesenteric ganglia were tumefied and red, and the mucous membrane of the duodenum covered with red striæ; the small intestines were healthy, but were very much distended with gas; the lungs were healthy, but there existed cellular adhesions between the two pleuræ. The two lateral ventricles of the brain contained an abundant serosity; the mucous membrane of the nasal fossæ was very red, tumefied, and soft; the larynx and bronchiæ were healthy.

I have been, in the disease of this child, very minute, because it appeared to me interesting to report all the circumstances of the progress of chronic coryza; at the termination of which, the pituitary membrane had experienced the disorganization which a long continued inflammation usually produces on mucous membranes. We ought also to remark the cerebral and gastrointestinal complications, the state of marasmus to which the patient was reduced, and the fatal effect of an abuse of regimen, administered by those who had the care of this child, and who were imbued with those prejudices which induce people to give to the sick, and particularly to children, a large quantity of food to strengthen them.

The most common complications of coryza in young infants, are cerebral affections. From the proximity of the inflammation to the brain, an irritation is transmitted to that organ, from which results acute hydrocephalus, as we have seen was the case in the preceding instance, or accidents not less fatal; it is therefore not unusual to find children experience, in the course of this disease, a drowsiness and prostration, and even sometimes convulsions, which are evident signs of cerebral irritation.

The treatment to be adopted in this disease must vary according to the age of the child; in young infants that are sucking, it will be necessary to suspend alimentation by the breast, on account of the great pain they experience while sucking, and the difficulty of respiration which attends the action, thereby increasing the danger of the symptoms attending inflammation of the nasal fossæ. Besides, children in this case suck so badly that the quantity of milk they take is almost insufficient to nourish them, and they are exposed to the hazard of perishing of languor or hunger. Drinks ought to be given with great caution, and they ought to be fed with a spoon with cows' or goats' milk, di-

luted with groat water. If deglutition appear to be very difficult, we must have recourse to nutritive injections. There is no advantage in directing the vapor of a decoction of emollients towards the nasal fossæ of young infants, for the air passages are so narrow that the momentary swelling which it occasions, will only increase the difficulty of respiration. The principal means to be employed in the treatment of coryza in young infants, are the removal from the causes which may produce it, laxative drinks, such as a decoction of prunes, or even the administration of a saline purgative, or calomel in a dose of two or four grains, in order to establish a revulsion on the intestinal tube, and by the application of a blister either to the neck or to one of the arms. If any cerebral complication should arise, it must be met with appropriate means. If, after having combatted the inflammation in the usual manner, there should be formed any pellicular concretions in the nasal fossæ, it would be proper to have recourse to some of the extraordinary measures which are recommended in croup. We might, for example, blow gently some fine calomel, or a mixture of sugar and alum finely powdered, into the nostrils. The introduction of this powder into the nose will be less dangerous than into the trachea. We ought, above all, so soon as there is perceived any difficulty in sucking, to remove the child from the breast, because this difficulty may become, by frequently recurring, at last the cause of the most distressing effects, either with regard to the nutrition of the child, or by the production of pulmonary or cerebral congestions.

SECTION II.

DISEASES OF THE LARYNX AND TRACHEA.

Development and congenital malformations.—During fœtal life the pharynx and trachea exhibit no series of progressive phenomena that can be observed or followed in such a manner as to trace with exactness the various periods of their formation. Their existence and perfection are not of so great importance during intra-uterine life as that of the intestinal tube, kidneys, bladder, etc.; they do not exhibit, like these organs, appreciable stages of formation; and from their first appearance, which

occurs about the second or third month of conception, there is already distinguished a canal, enlarged at its superior part, and divided inferiorly in a manner which enables us to recognise evidently the traces of the larynx and trachea; and at the third month transverse lines may be seen indicating the cartilaginous rings of the trachea. At six and seven months it is easy to distinguish the projections and depressions which form the ventricles and cords of the glottis. The mucous membrane which covers these parts is usually of a deep rose-color; this color is less vivid in the trachea where the internal membrane often appears in longitudinal folds, which disposition of the part permits an enlargement of the canal whenever it is distended with air. It is likewise common to find very clear and ropy mucosities covering and lubricating the walls of the trachea. At the period of birth, the cartilages, bones, and muscles of the larynx are perfectly developed, although small and very flexible; and the cartilages of the trachea perfectly distinct from each other, are soft, and filled with blood; and there are often found transverse red striæ, corresponding, in infants at birth, to the cartilages of the trachea, and which ought not to be taken for marks of inflammation.

The congenital malformations of the larynx and trachea are of much less common occurrence than those of many other organs; the complete absence of these parts occurs in cases of acephalia. The larynx may be of extreme smallness or only very narrow, of which I have given an instance in the article on malformations of the tongue; the absence or imperforation of the epiglottis, and of some one of the cartilages of the larynx, have been also observed. I have seen in an infant at birth, a strongly marked defect of symmetry between the two lateral portions of the larynx. All these malformations are of little importance at a period when the functions of this organ with respect to phonation, are, as it were, a nullity; but they may afterwards injure speech or singing. The divisions of the trachea may differ greatly in size and extent, and in this respect correspond to a similar difference in the size of the lungs.

Diseases of the larynx and trachea, developed before or during birth.—I have not seen any evident trace of inflammation during intra-uterine life, but I have often met with a very con-

siderable sanguineous congestion in premature children ; several times this congestion, known by a deep redness of the laryngo-tracheal mucous membrane, was accompanied by a sanguineous exhalation, which extended even to the bronchiæ, so that it appeared probable that it was the result of an afflux of blood towards these parts, either during the latter period of intra-uterine life or during birth.

There is a condition of the larynx and trachea which, without having reference to any lesion whatever of the mucous membrane, does not the less merit the notice of physicians, and especially of accoucheurs. I allude to the abundant mucosity which in some infants obstructs the larynx and trachea, to that degree as materially to hinder the establishment of respiration. This affection is usually accompanied with a peculiar alteration of the cry, which is husky and almost always incomplete. The reprise is not heard but momentarily, and when heard is hoarse and jerking. It is probable that this mucosity was accumulated in the larynx and trachea before birth. The trifling effects of this accumulation are but of short duration ; a few efforts of inspiration and expiration are sufficient to render the cry free and perfect. The accoucheur may assist the discharge of this mucosity with the fingers or a feather introduced into the entrance of the larynx, where it usually adheres. I have sometimes seen on the internal surface of the trachea of a dead fœtus, small violet-colored ptechiæ, but know not to what cause to attribute them.

Diseases developed after birth.—There are three kinds of diseases affecting the larynx of sucking children—congestions, inflammation, and œdema.

Congestions.—The larynx is almost always injected in infants at birth ; this injection, after continuing for some time, will gradually cease, and finally disappear altogether. In infants of two to four months, the mucous membrane of the larynx is of a pale rose, and its color differs less from that of the trachea than it originally did. During life the larynx is easily injected, and it is always found more less red in almost every case of death from asphyxia. I have frequently noticed ecchymosis in the cellular tissue surrounding the larynx, as if external violence had been used to effect strangulation. In these cases of laryngeal

congestions, blood has likewise sometimes been found exhaled to a greater or less extent on the surface of the larynx and trachea ; this blood has also been expectorated by the infant at the period of death in considerably quantities. This is particularly observed in those infants, in whom the cellular tissue is œdematous or hard, and who, at the same time, exhibit an evident universal plethora.

Inflammation.—Laryngitis is of common occurrence among infants at the breast, but it is to be remarked that it is much less frequently seen than at a more advanced age. It may be simply an erythematic inflammation, or it may be complicated with the formation of pellicular concretions.

The erythematic variety may vary much with respect to its intensity ; it may be of a rose-color without any alteration of texture ; it is sometimes accompanied with tumefaction, or with softening or ulceration of the mucous tissue.

The causes of laryngitis are sometimes difficult to ascertain ; it may, however, arise from the impression of cold moist air, the action of cold wind, or wet feet, but above all, from prolonged cries ; it may also be produced by a previous phlegmasia occupying some other point of the mucous membrane of the respiratory passages.

This inflammation, even in its mildest form, is accompanied with an abundant secretion of mucosity, which is at first clear, but soon becomes thick and yellow. The respiration of the child is labored, and the cry sensibly altered. This alteration consists more in its tone than in its form ; both parts constituting the cry exist, but they are husky. When inflammation of the larynx is violent, the alteration in the cry is more evident ; it is often then so faint as scarcely to be heard, whilst the reprise is, on the contrary, acute and predominant. This particular modification of the cry of a child, as I have already remarked at the commencement of this work, is a positive sign that inflammation exists about the upper portion of the air passages, while the complete absence of the reprise indicates a lesion in the bronchial ramifications or the pulmonary tissue. It is important to remember this rule.

Laryngitis rarely exists alone ; it very often follows coryza, and is sometimes soon accompanied by inflammation of the tra-

chea and bronchiæ; it is also not uncommon to see inflammation of the larynx occur only after that of the nasal fossæ. The progress of the symptoms of this affection is usually rapid, and sometimes very obscure at its first appearance; but so soon as the inflammation becomes less intense, the alteration in the tone and form of the cry will enable the practitioner to recognise the disease without any difficulty; besides, it may be in our power, at times, to satisfy ourselves by inspecting the velum and surrounding parts, for the inflammation will extend even to them; and an erythematic redness extending to the larynx may be seen upon opening the mouth and pressing down the tongue.

This inflammation is seldom accompanied with vomiting, like that of the pharynx or œsophagus; yet the child sucks badly, and if too large a quantity of milk be taken into the stomach, it will often happen, at the moment of deglutition, that the pain caused by the movement of the pharynx will cause him to leave the nipple and give a sudden cry, causing the fluid introduced into the œsophagus to reflow towards the mouth; and some of it also penetrating the larynx, produces a sudden suffocating cough to the great danger of the child. This regurgitating movement, with the cough and suffocation following it, deserves our attention. In three children, who, when sucking, almost always experienced this suffocating cough on swallowing, I found a pulmonary congestion and an intense anginose affection, which were probably its cause.

A quantity of mucosity accumulated in the larynx may produce similar symptoms; this occurs when the child is sleeping, who awakes with a sudden start, and coughs, making an effort at crying, which however is only accomplished when, with the most painful exertion, the mucosity obstructing the passage to the glottis is removed. I will here make a general remark in relation to inflammations of the larynx in young infants; when the passage is very narrow, the least tumefaction resulting from inflammation may produce suffocation, followed by spasm and distress, during the existence of which the physiognomy fully expresses the suffering of the patient. The face becomes purple, especially around the alæ of the nose and about the mouth; the nostrils dilate, the mouth remains wide open, and at each movement of inspiration, there occurs a kind of spasmodic contraction

of all parts of the body, accompanied with a dilatation of the walls of the thorax: this spasmodic state is observed in the youngest infants. It is without doubt this assemblage of symptoms, to which authors have given the name of angina suffocatoria. It is frequently noticed in infants, and I have almost always observed in those that have died of this disease, a large quantity of thick mucosity, which being collected in the cavity of the larynx, and having caused an obstruction, produced asphyxia. The following case presents something analogous to what I have stated.

CASE LX.—Auguste Borlet, aged thirteen days, entered the infirmary on the 22d of May. This child was strong but pale. There had for two days existed considerable vomiting; the tongue was red at the point: the pulse exhibited nothing worthy of remark. (*Sweetened rice-water, emollient injection, milk and water.*) From the twenty-second to the twenty-sixth, no remarkable symptom existed; but at this period, there occurred a coryza, accompanied with an abundant secretion of nasal mucosity, and a slight swelling of the nose; the eyelids were also a little tumefied. The coryza soon disappeared, and the child appeared tolerably well until the 10th of June. The respiration then became painful, the face purple for a moment, and when the child awoke, the cry was for a short time husky, and did not become clear until after several efforts at respiration; and although both parts could be heard, yet there always existed something obscure or husky, which was not natural. (*Pectoral ptisan, sinapised cataplasm to the feet, linctus, diet.*) On the fifteenth, the child grew pale and thin, and suffered occasionally a severe suffocation, but the efforts at coughing and vomiting caused the ejection of a quantity of thick mucosity; the hands were often purple; there neither existed diarrhœa nor vomiting—pulse from fifty-eight to sixty. On the eighteenth, the cry was still husky, the respiratory movements were quick and short, the thorax gave a dull sound at its posterior part, and an imminent suffocation occurred whenever drink was given. On the twentieth, he was so feeble and sunken, that no symptom could be observed; he gradually wasted away and died on the twenty-third.

Post mortem examination.—Injection of the base of the tongue, an intense redness, tumefaction, and softening of the mucous membrane of the larynx, the walls of which were covered with thick and almost membranous mucosity. The trachea and bronchiæ were of a

violet red; the lungs very much engorged at their posterior border. In the ileon, there were fourteen inflamed follicular patches; the colon was covered with a number of brown striæ, the brain was perfectly healthy.

We have seen in this child the ordinary accompaniments of inflammation of the larynx continued for a length of time, and it cannot be questioned that the imminent suffocation which occurred from time to time was owing to the presence of thick mucosity accumulated in the larynx, and to its narrowness from the tumefaction of its walls. We should also remember that it followed the coryza, which, as has been already observed, is of very frequent occurrence in young infants.

Laryngitis does not always exist alone; it often arises in the course of some other disease, as scarlatina or variola. The anatomical characters of the inflammation are not then confined to the erythematic redness, but they are sometimes analogous to the cutaneous phlegmasiæ of which this disease is a concomitant symptom. Pustules, similar to those of the variolous eruption, are frequently seen developed in the trachea and pharynx; in this case the symptoms are the same as those just described, at least when the phlegmasia is not complicated with the formation of a pellicular concretion, and then the symptoms are those which characterize croup.

This affection may terminate in resolution at the end of a few days, pass into a chronic state, as we have seen, in the subject of the preceding case, or soon end fatally from asphyxia. The disease should, therefore, be watched with great care from the commencement, that it may be effectually combated before it has made much progress.

After the disappearance of the inflammatory symptoms, the cry continues sometimes husky, arising from the altered state of the tissue from the inflammatory action, affecting the integrity of the sound produced by the air in the larynx. I have often observed in adults who have had the small pox in their earliest infancy, a peculiar huskiness of voice, produced without doubt by the extension of the phlegmasia to the larynx, the texture of which had been either modified or altered.

Treatment.—When symptoms of an anginose affection are

perceived in an infant at the breast, we ought in the first place to endeavor to prevent its taking too much milk at one time, and particularly its sucking with eagerness; hence it should be put to the breast frequently and for a short time. If the inflammation be intense and deglutition painful, it will be necessary to suspend sucking altogether, to keep the neck warm by means of a double woollen cravat, or a poultice, to apply two, three, or four leeches, according to the age and strength of the child, above the clavicle, some distance from the seat of the disease. The clothes should not be too tight; for the difficulty of respiration is already very great from the tumefaction of the larynx, without our adding more by the distress which may result from compressing the thorax. Hot cataplasms to the feet are sufficient oftentimes to produce in them a slight rubefaction; the application of mustard in young infants will often cause great irritation and inflammation, terminating in ulcers very difficult to cure. If the intestinal tube be healthy, and if there exist any constipation of the bowels, two or three grains of calomel followed by a half an ounce of manna dissolved in two ounces of milk, or by an injection of half an ounce of castor oil, incorporated with warm water by means of half of a yelk of an egg. Should any cerebral complication arise, it will be necessary to apply one or two leeches behind each ear; revulsives may also be employed at the same time.

Should the disease become chronic, after having used the means just enumerated, recourse must be had to a blister applied to the neck, or ammoniated liniment, or tartaremetic ointment may be applied by friction to the lateral parts of the neck. After the disappearance of the disease, it would be well to keep the neck of the child for some time enveloped in some fine fur, or swans-down, or even a piece of flannel, to guard against a relapse, which would be more serious than the first attack.

Inflammation with altered secretion, or croup.—Croup consists of an inflammation of the larynx and trachea, complicated with the rapid formation of a pellicular concretion spread over the walls of the larynx, and is propagated, in some cases, even to the trachea and bronchiæ.

The remote causes appear to be the same as those of laryngitis or bronchial catarrh; but it is difficult to explain in a satisfac-

tory manner the immediate cause of the formation of the false membrane which occurs in this affection. It is almost always during the prevalence of epidemic catarrh, or whooping cough, that the croup is most rife; it precedes or accompanies one or the other of these phlegmasiæ, and is sometimes even a complication of them. M. Bretonneau has in vain attempted to separate the connection existing between the catarrhal affections and croup, and to controvert the opinions that have been held for half a century by Home, Rosen, Michaelis, and supported by Jurine, M. Double, Vieusseux, Royer-Collard, MM. Bland, Valentin, Bricheteau, and Desruelles.* The physicians who, with M. Bretonneau, have maintained opinions opposite to those of the authors just mentioned, have endeavored to prove that there is something specific in the nature of croup; but without admitting that there is any thing specific in it, the formation of the false membrane which characterizes it, may be explained to a certain extent. I have already considered this subject in detail, in an essay inserted in the "*Archives générales de médecine*" for the month of December, 1826. The following is the recapitulation of the reasons for believing it in our power to explain in what consists the peculiar nature of croup.

1st. There exists, as it were, but a degree between the thick, tenacious, filamentous mucosity with which inflamed mucous membranes cover themselves, and the membranous exudation of croup. 2dly. The membrane of croup presents nearly the same chemical elements as this mucosity where fibrin predominates. We have already seen the same analogy between the pellicular excretion of muguet and the mucosity of catarrhal affections; so that the puriform mucosity of catarrh, the false membrane of croup, and the excretion of muguet appear to be but alterations of the same secretion, and vary only with respect to their form, and the parts they occupy. 3dly. Before this membrane appears, the mucous membrane is always much inflamed, red, and gorged with blood: the subjacent tissue also participates in this injection, and when the inflamed membrane is at the same time the seat of sanguineous exhalation, this exhalation is seen to be accompanied or followed by pellicular concretions, from which it is to be inferred that croup is a catarrhal

* *Traité théorique et pratique du croup.* Paris, 1824.

phlegmasia, but that the blood destined to the secretion of mucosity is, in the case under consideration, concentrated in greater abundance, or rendered plastic by inflammation, and imparts to the mucosity that portion of its composition which concretes the quickest, that is, the fibrin; whence arise the striæ, pellicles, and white patches with which the mucous membranes affected with muguet or croup are covered.

Children at the breast are much less subject to croup than those of a more advanced age. It is between the ages of two years to eight or ten that this disease is the most prevalent. Young infants, however, are liable to pellicular inflammations of other mucous membranes, such as those of the mouth, œsophagus, and nasal fossæ, whilst the opposite condition exists in children of more mature age. Age, therefore, and the organic modifications which appertain to it, and which can more easily be understood from their effects than by their physical appearances, seem to produce a difference which ought to be noted, although we are unable to explain it. But on the other hand, the readiness with which symptoms of suffocation arise when the slightest inflammation is manifested in the air passages of young infants, render the ordinary tracheal and laryngeal affections almost as dangerous as croup: we should on this account watch with the greatest care the development and progress of the symptoms of laryngo-tracheal inflammation in infants.

From what I have said of the greater frequency of croup at an age more advanced than that of the children whose diseases form the object of this work, I will not enter into a detailed history of this disease, on which a number of monographs have been published;* but will, therefore, only give succinctly the progress of the symptoms and the treatment of the disease.

Symptoms.—When the pellicular formation occurs on the inflamed surface of the larynx, the cry is altered; the reprise only is heard; it is acute and sudden, like the crowing of a young

* Consult, Home, *Inquiry into the nature and cure of croup*. Edinburgh, 1778. Michaelis, *De angina poliposa seu membranacea*. Arigentorati, 1778. Royer-Colard, *Rapp. sur les Mémoires Vieusseux*, Jurine, Albers de Bremen, Caillau, Double. Desruelles, *Traité du croup*. Bland, *Nouvelles recherches sur laryngo-trachéite*. Bretonneau, *De la Diphthérie*. Bricheteau, *Precis analytique du croup*. Also the excellent work of M. Valentin.

cock ; sometimes also it is even very much smothered. The cry proper is no longer heard except momentarily, or if renewed, is much altered. The cough which occurs in paroxysms, produces in the child the greatest anxiety ; the most painful efforts at inspiration are made, and it is then that the interval of the cry exhibits the characters of which I have spoken. The painfulness of respiration is almost constant, but it is, besides, subject to very evident exacerbations and intermissions. To these symptoms, the commencement and return of which are almost always sudden, is to be added pain in the larynx, of which infants at the breast are unable to indicate the existence in any other way than by continually carrying the hand towards that part, as if to remove something—a distress which is always augmented whenever there is an exacerbation of the cough ; nasal hemorrhages, which are very rare in young infants, and consist rather of a sanguineous expansion than of true hemorrhage ; and lastly, drowsiness, which is a frequent and severe concomitant symptom of croup, indicating a cerebral congestion, or even the existence of acute hydrocephalus, a lesion of very common occurrence in infants that have died of croup. A greater or less quantity of the pellicle is rejected by vomiting and expectoration, when great relief is experienced, until a renewal of it again obstructs the air passages, causing a return of strangulation, to which the child is every instant exposed. Death almost always suddenly terminates this frightful disease, against which the resources of art are too often powerless.

Treatment.—Two distinct conditions present themselves in croup ; inflammation, which is the primary cause of all the other symptoms, and the suffocation, either mechanical or spasmodic, produced by the membrane which forms in the trachea and larynx.

All the means which have been pointed out for the treatment of ordinary laryngo-tracheal inflammation—such as sanguineous evacuations, general, local, and cupping emollient drinks, topical emollients to the throat, revulsives to the skin and intestinal tube—should be actively employed from the commencement of this disease.

Symptoms of suffocation arise not only from the mechanical embarrassment caused by the membranous formation, but like-

wise from a kind of spasm of the larynx, as has been remarked by all authors. Therefore, while we attempt the removal of the membrane by emetics, it will, at the same time, be necessary to administer some antispasmodic, as an injection containing eight or ten grains of assafœtida, or a few drops of tincture of castor, or frictions on the throat, with a liniment composed of camphorated oil of chamomile, or what is still better, with a mixture of ether and water. There is still another remedy which must not be neglected, and the use of which M. Guersent strongly recommends.* It is a bath at the temperature of twenty-five degrees, (88° Fahr.) or more. Nothing calms the restlessness of the child more than this, who should be kept in it as long as possible, taking the precaution to cover the bath so that the vapor which arises may not determine an afflux of blood to the head, which would be very injurious. It is almost always necessary also to apply two or three leeches about the mastoidean region, to meet the symptoms of meningitis or hydrocephalus, which are sometimes observed in infants affected with croup. In addition to these means it will be well to apply a blister to the legs or thighs, or to rub the lower parts of the throat with ammoniacal liniment, or tartar emetic ointment. I saved a child of the age of fifteen months, affected with croup, by using for three days the various means which I have advised: after employing local bleeding and baths, and purged with calomel, I had recourse to syrup of ipecacuanha, which was quickly followed by an abundant expectoration and vomiting, discharging thereby a quantity of the membranous formations. This treatment was pursued for three days without intermission, when the symptoms of croup disappeared; the cry, however, continued hoarse.

Subsequent observations have satisfied me of the advantages arising from the use of calomel administered in repeated doses from the commencement of the disease. It appears to act by augmenting and modifying the secretion of the mucous membranes, which are in this manner relieved of the membranous formation on their surface. There is still another circumstance upon which a great part of the utility of calomel rests in young infants who do not expectorate, but swallow all that accumulates

* Article *Croup* in the *Dict. de méd.*, in 21 vols.

in the back part of the mouth—calomel acting not only in detaching the membrane, but also causes its expulsion by stool.

It often happens that membranous formation is not passed in a tubular form with the *fœces*; the fragments only appear, resulting from the division of these false membranes by the action of the mercurial salt, or from a kind of trituration which it experiences in passing through the organs of digestion.

I have never employed calomel except in doses of eighteen or twenty grains in twenty-four hours, and have found it sufficient to produce the results intended. At the same time, I am particular in directing purgative injections during the mercurial treatment, for if constipation should exist there is a great risk of salivation. Mercury usually produces abundant liquid and green stools; it produces but little pain, and no augmentation of the general symptoms which accompany croup. M. Guersent often incorporates it with honey; but I have remarked that the consistence of honey renders the deglutition tedious, especially in a young infant where the larynx and pharynx are obstructed by an abundant mucus. The retention of this thick substance in the vicinity of the air passages contributes also to render the respiration more suffocating. The following is the mixture in which I administer it.

℞ Gum. Tragacanth. gr. x.
 Aquæ destil. ʒij.
 Hydr. proto-chlor. gr. x.
 Syrup simp.
 " Ipecac. aa gr. x.
 Aquæ Auran. ʒj.

This mixture is to be shaken every time it is to be given, and a teaspoonful of it administered every half hour.

Yet I never have recourse to this therapeutic agent except in connection with direct antiphlogistic means, such as the application of leeches to the neighborhood of the larynx and trachea, and the use of emollient drinks and topical applications.

To recapitulate; I have come to the conclusion—1st, That it is not hazardous to employ the proto-chloride of mercury in doses of eighteen or twenty grains in twenty-four hours in children affected with croup; 2dly, That this medicine powerfully seconds the effects of sanguineous evacuations; and while the lat-

ter relieves the inflammation, the mercury expels the product of it from the system ; 3dly, That supposing it dangerous to administer this medicine, it is better to risk this danger, than to abandon the child to the greater danger of the disease with which it is affected. In all cases there is much less risk incurred in using the proto-chloride of mercury obtained by sublimation with aqueous vapor.*

Is it necessary, as M. Bretonneau advises, to open the trachea and introduce a quantity of calomel or alum, to destroy and remove the membranous pellicle ? My experience has not as yet sufficiently confirmed me in this measure, and I should not feel authorized in using it until after having made use of other and well-tried means, where only extraordinary measures are allowable, and, as Hippocrates says, where circumstances become desperate. I shall never forget the case of a young girl to whom I was called on the third day of croup. At first I had recourse to the most energetic antiphlogistic measures ; my efforts being without avail, and the child rapidly approaching her dissolution, her father, who was not ignorant of medicine, forced me, as it were, in his despair, to use the new means which had been recently advised in the treatment of croup. I curved a piece of whalebone and armed it with a pledget soaked with a concentrated solution of alum, and introduced it into the larynx and trachea ; but immediately the child, who was tolerably calm at the time, was seized with violent convulsions, and perished in my arms in less than five minutes. Although it was evident that this child would die, this distressing accident made so great an impression on my mind, that I resolved never again to introduce any medicinal substance into the irritated and inflamed trachea of an infant.

Frictions, with mercurial ointment on the sides of the neck, or calomel given until an abundant salivation is produced, have likewise been employed with success. These means have effected the removal of the false membrane, or entirely prevented its reproduction.

As croup usually prevails epidemically, it will be necessary to

* See my *Mémoire sur l'emploi du calomêlas dans le traitement du croup et des angines pelliculeuses*, (Arch. gén. de méd. t. xx., 1829.) See Appendix.

remove those children that are not affected with it, to places where it has not extended its ravages.

Œdematous affection of the throat.—There is often found, on examining the bodies of children who have died with symptoms of an anginose affection, in place of a well-marked inflammation, a greater or less œdematous tumefaction of the laryngeal parietes. The external signs of this affection are not easily recognised; there is, as in inflammation of these parts, an alteration in the cry, but the other symptoms are less evident, as this œdema occurs in general among very feeble children, and who consequently do not exhibit a sufficient development of their functions to allow of their disorders to be appreciable. I have, however, observed that children affected with œdema of the glottis, had, at the same time, an œdema of the cellular tissue in various parts of the body, and that the cry, very irregular, was almost always husky and incomplete, and was also trembling, like the bleating of a goat. It is to this modification that I have given the name of “Chevrotant.” I have seen this peculiar phenomenon produced in three infants affected with œdema of the glottis. I will give an instance of one of these.

CASE LXI.—François Delau, aged two days, a very robust child, but with the integuments livid, and the legs and feet œdematous, entered the infirmary on the 13th of October; his cry was painful, smothered, and trembling; it resembled that produced by the action of scraping the bow over the string of a violin. His limbs were cold; pulse slow, small, and difficult to be felt. On the fourteenth, a general icterus appeared over the body. (*Sweetened water, milk and water.*) The extreme difficulty of respiration and the state of general congestion of this child induced M. Baron to apply a leech to each axilla. The congestion of the integuments diminished, but the face continued of a deep red; the character of the cry continued the same. On the sixteenth, a violet-colored ecchymosis appeared suddenly on the right cheek, and extended even to the upper lip, which became the seat of a considerable œdematous swelling. The cry of this child continued husky; the pulsations were slow, and so obscure that it was impossible to count them. Some thick, frothy, sanguineous mucosity was passed by the mouth and nose. He died at night.

Post mortem examination.—The mouth was healthy, but the glottis presented a considerable œdematous swelling; the lateral

walls of the larynx were thick, white, and so tumefied, that they almost touched. On pricking them with the point of a scalpel, no water issued; the serosity was, as it were, a kind of jelly in the sub-mucous cellular tissue. There was a very marked congestion at the posterior border of each lung. The other organs of the body did not present any thing remarkable; the liver was very much gorged with blood, and the bile abundant and black.

There was in this case a remarkable coincidence between the œdema of the limbs, face, and glottis; a relation not less intimate existed also between the circulation, and the serous infiltration of which we have spoken; so that taking into consideration these different phenomena and the peculiar alteration of the cry in an infant whose external parts were œdematous, one might be led to suspect the existence of the disease we have described. It is only by grouping together the different physiological phenomena presented by a child, that it is possible to draw in like cases, if not a positive, at least a probable conclusion, for it is impossible to arrive at a degree of certainty from any isolated symptom.

I have seen this affection in children of more advanced age, and who after having been reduced to a state of marasmus, presented an infiltration in different parts of the body at the same time. In some of them the cry was husky, feeble, and incomplete, but it never presented, in its tone, the peculiar modification which was observed in the preceding case. It would seem as if the "chevrotant" cry was either more rare or more difficult to observe in proportion as children advance in age.

The treatment of this disease need not be directed exclusively to the part affected; we have seen that the œdematous angina in the child whose case is repeated above, was accompanied with a pulmonary congestion and extreme lentor of the circulation. Both these conditions must be met by appropriate treatment, which will be pointed out below. The effect will cease when the cause shall have been directly met. It is much more difficult to treat and cure œdema of the glottis, which arises in infants emaciated and worn out by some chronic disease, because then the œdema is not always caused by an evident embarrassment of the circulation, or by the congestion of the blood in the respiratory organs. It will be necessary in such a case to attempt

the resolution of the disease by the aid of dry or aromatic frictions, seconding the effect of these means by diet and regimen suitable to the condition of the child.

I cannot advise the use of certain aromatic vapors introduced into the air passages, for the narrowness of the larynx and trachea, and the great disposition of young infants to spasm of these organs, naturally contra-indicate the employment of these means, which, as in adults, produce very uncertain, or perhaps very little effect.

I will not stop to give a particular detail of the diseases of the trachea; the history of their symptoms is comprised in those of the larynx or bronchiæ; besides, it is very difficult in young infants to make an accurate diagnosis between the diseases of the trachea and larynx.

SECTION III.

CASES OF THE THORACIC PORTION OF THE RESPIRATORY APPARATUS.

I shall consider in this section diseases of the lungs, bronchiæ, and pleuræ.

Development and congenital malformations.—I cannot dispense with the consideration of the development of the pectoral cavity, for if it perform an active part in the functions of respiration from its mobility, and as its alternate dilatation and contraction very materially assist the dilatation of the lungs, its malformations must have great influence on the act of respiration. Hence I shall consider together the development of the thorax and lungs.

The thorax at first is but a very narrow cavity, the walls are very thin, consisting of nothing more than a flexible pellicle, in the centre of which appear some semicircular white lines, which afterwards form the ribs. In proportion as the child advances in age, and the lungs are developed, the thorax becomes more spacious, its cavity is developed, more especially at the lower part, for at first the abdomen forms almost the whole of the trunk of the embryo; and upon its superior and lateral walls are seen two small, round, and slightly projecting eminences constituting

the rudiments of the arms. The two sides of the thorax do not approach each other, to complete the thoracic cavity, for the thorax is always closed unless there exist some malformation. At the period of birth, the chest has acquired considerable dimensions; yet with respect to the abdomen, it is much less capacious than at a more advanced age, and especially than in the adult.

During the time the pectoral cavity is acquiring an increase in its dimensions, the lungs themselves have also passed through their different stages of development.

About the sixteenth week, the lungs first appear; they are much lower than the heart, and it is said that in general they are less voluminous. I have been able to discern them in an embryo of six weeks, which I dissected with M. A. Danyau. The heart was of a globular form and about the size of a millet seed; and the lungs, instead of being smaller, were united at their lateral parts, under the form of two transparent vesicles, flabby and much larger than the heart, and hollow interiorly, as was proved by a magnifying glass. These two organs, closely pressed together, were supported by a very thin membrane which separated the chest from the abdomen, and which was evidently the diaphragm. When the lungs first appear, they have a smooth white surface; but in proportion as the child advances in age, grooves appear indicating the separation of the lobes, and then lines which mark the division of the lobes appear on the external surface of the lungs; next they are solid; the veins, arteries, and bronchial ramifications begin to grow; and their size increases at the same time that the pectoral cavity enlarges, they assume a rose color, and at the period of birth exhibit the anatomical characters which we shall now consider.

From the seventh to the ninth month, the lungs possess nearly the form which they afterwards have; but their color is different; and it varies in different children, for they are more or less pale or colored, according to the exsanguineous or plethoric condition of the subject. Some lungs exhibit red lichenoid spots on their surface, which would probably become slate-colored, as is observed on the surface of the lungs of an adult; others, on the other hand, are white, or of a faint rose-color; their color has a close resemblance to those of an ox or a calf. I have twice seen in

adults this extreme paleness of the lungs. Is this kind of leucopathy of the lungs an effect of an alteration of the primitive congenial color of the pulmonary tissue? I am much disposed to believe that this is the case.

During intra-uterine life, the lungs fill the entire pectoral cavity, against the sides of which they press to such a degree as to receive the impress of the ribs, which are always more projecting on the interior of the thorax in a child than in an adult. I mention here these depressions on the lungs in some infants, that it may not be considered an effect of a pathological condition. I have noticed the same thing in the case of adults, and it is possible that these furrows were formed during intra-uterine life, and continued to an advanced age. If this be so, it ought not to be considered either in adults or infants as the effect of an accidental tumefaction of the organ; and if the projection of the ribs in adults is not sufficiently evident to account for these depressions or notches at the posterior border of the lungs, it is not difficult to account for this phenomenon, by referring it to a period of life when the ribs are more prominent, and that it has maintained the same appearance notwithstanding the progress of age. I have heard doubts raised by Professor Laennec, on the possibility of these pulmonary depressions by the ribs, because, he observes, the latter are not sufficiently projecting to cause these furrows: but the explanation which I have given ought to dissipate every doubt on this subject, and suffice to account for these furrows, which the author of mediate auscultation has regarded as chimerical.

When the thorax of a child that has not respired is opened, one is struck with the analogy between the thymus gland and the two lungs; it would seem as if this body was a third lung, in which no bronchial ramifications appear. I note this resemblance, because after birth the thymus gland, preserving still the same aspect, may serve as a point of comparison, and guide us in the examination which we propose to make of the tissue of the lungs when modified by respiration or not. The pulmonary tissue in which the air has not penetrated, is flabby and reddish, like the tissue of the spleen; for notwithstanding the existence of the ductus arteriosus, which allows the blood sent from the heart to pass directly into the aorta, yet a certain quantity pene-

trates the lungs, either by mechanical reflux, or that because this blood is necessary for the purpose of nutrition of the organ, so that the pulmonary arteries and veins are very frequently filled with blood at some distance from the pulmonary tissue. The bronchiæ, usually of a pale rose, are sometimes colored by a slight sanguineous exudation.

After birth the tissue of the lungs that have been penetrated by the air respired by the child, becomes lighter and crepitating, and always possesses more blood, all other things being equal, than the lungs of adults. I will here mention a phenomenon which it is important to note. In almost all young infants, there is found a very evident sanguineous congestion at the posterior border of the lungs, and especially on the right side.* But it is evident that this congestion is a true mechanical phenomenon, and I am disposed to believe that the congestion occurring on the right side among the children of the *Hospice des Enfants Trouvés*, arises from the common prejudice of the nurses in being careful to lay the child in bed on the right side. Notwithstanding this congestion of the pulmonary tissue, the bronchiæ are not always red, but are usually distinguished by their white appearance, contrasting strongly with the redness of the parenchyma of the lungs. Having thus rapidly treated of the development and principal characters of the lungs in health, let us make a remark on the malformation of these organs and of the thorax.

Both lungs, or one of them, together with one or both of the bronchiæ, may be entirely or partially deficient in acephalous children. Otto, as quoted by Meckel, has observed the occlusion of the trachea with an absence of the cranium. An extreme smallness of one or both of the lungs, or a narrowness of the pectoral cavity, may occur; or the abdominal viscera may be found in the thorax in consequence of malformation of the diaphragm. The lungs, which present on one side two lobes, and on the other three, separated by deep fissures, may exhibit a unique mass without division, or divisions inverse to those which exist in a normal state, or, lastly, fissures more or less numerous. The inversion of the right lung to the left side, and vice versa, is usually found with an inversion of the heart. Finally, they may

* Professor Chaussier has a long time since remarked this phenomenon.

not be contained in the thoracic cavity when the walls of this cavity are incomplete in consequence of an original malformation. Haller says that this malformation of the pectoral parietes is more rare than that of the abdomen; yet he adds, "*Sunt tamen etiam exempla in quibus sternum costæque imperfectæ cor emiserunt, ut nudum appareret, quale in pullo est, qui primos dies incubationis experitur.*"* This illustrious writer quotes, in support of his opinion, cases reported by Baron, Bianchi, Fracassini, etc.

Among these malformations, those of the pectoral cavity which may oppose a free expansion of the lungs in the act of respiration, will cause, in new-born children, symptoms of a nature more or less serious. It can be easily conceived that when a congenital diaphragmatic hernia exists, and the stomach, omentum, or intestines are introduced into the thoracic cavity, a considerable obstacle will exist to the proper dilatation of the lungs, and give rise to a variety of symptoms. It is not necessary that there should be so great a malformation in that cavity to produce an evident disturbance in the functions of the respiratory apparatus; the simplest malformation will sometimes give rise to symptoms that would almost lead to the belief that they were the result of a lesion of the bronchiæ, pleura, or lungs. These symptoms may perhaps be little apparent at the period of birth, but in proportion as the child advances in age, and the functions of respiration become developed, and the necessity of a greater expansion of the parietes of the thorax arises, when they are too narrow, or too much depressed, they oppose the dilatation of the lungs, producing symptoms which might be attributed to some lesion of the lungs or bronchiæ, if post mortem examinations did not prove their integrity.

CASE LXII.—*Malformation of the thorax, dyspnœa.*—André Alpin, aged ten months, entered the infirmary on the 14th of August. This child was pale and thin; the chest exhibited at the sides a considerable depression; the limbs were long, and the articulations were very large; there existed the commencement of a gibbosity at the dorsal region of the vertebral column; the abdomen was constantly swelled. This child had been affected for three months

* *Opera minora—De monstris*, chap. v.

with a continual cough and dyspnœa, which increased whenever he was laid down upon the back, or moved about. His sleep was often interrupted by a sudden choking, which ceased almost immediately upon raising him. The heat of the skin was very great and burning; the pulse was small, thready, and frequent; percussion gave only a dull sound. (*Linctus, gummed marshmallow water, milk and water.*) On the sixteenth, the same general state continued; cry painful and short. On the seventeenth, restlessness; violet tint of the face, cry plaintive, face painful, pulse quick, heat burning. (*Four leeches to the base of the thorax, sinapism to the feet, gummed marshmallows, diet.*) After this, the child presented nearly the same appearance; he did not appear to have experienced much relief from the application of the leeches; he became pale, was less restless, respired with difficulty, and died on the 23d of August.

Post mortem examination.—The œsophagus was healthy; the mucous membrane of the stomach was of a brown color, and contracted in wrinkles; an abundant mucosity existed in the small intestines, the internal membrane of which was thick, soft, and colorless; a tumefied follicular plexus of a slightly red color existed in the inferior third of the ileon, and a follicular eruption in the colon. The lungs and bronchiæ were perfectly healthy; but they were closely compressed by the walls of the thorax, the transverse diameter of which was very small. The fœtal openings were obliterated; the cerebral substance was healthy; yet there existed a large quantity of serosity in the lateral ventricles.

The dyspnœa, and the cough which accompanied it in this child, therefore were the effect of the little development of the thoracic cavity, for there was neither bronchial catarrh, nor pneumonia, although the existence of these diseases was suspected and the patient treated accordingly.

M. Dupuytren has published an interesting essay on this subject in the fifth volume of the *Répertoire général d'Anatomie*. He has frequently observed a swelling of the tonsils in these children which he has even been obliged to cut out.

§ I. DISEASES OF THE PLEURA, LUNGS, AND BRONCHIÆ BEFORE BIRTH.

Diseases of the pleura, lungs, and bronchiæ may be separated

into those which arise during intra-uterine life, and such as manifest themselves afterwards.

Congenital pneumonia and pleurisy.—Inflammation of the pleura and lungs may occur before birth. Some accoucheurs, and among others Mauriceau, have given instances of its occurrence. I also have often had opportunities of proving this fact. In three children that died on the day after birth, I found an alteration sufficiently advanced to satisfy me that the disease had commenced while the child was in the uterus. In two particularly, the left lung was strongly hepatized at the base; and if this alteration in the tissue did not exist during intra-uterine life, it probably was developed during birth or immediately after. This affection always interferes with the establishment of respiration, and consequently causes the death of the child. The following case is an interesting one in reference to this subject.

CASE LXIII.—*Congenital pneumonia.*—Larché, born during the night, was placed, on the 27th of January, 1826, in the “Crèche” of the Hospice des Enfants Trouvés. He was sent immediately to the infirmary, in consequence of his extreme feebleness; he was small, pale, and thin; the face became purple every moment; respiration was slow and difficult, and the pulsations of the heart very obscure; the chest on percussion gave a dull sound. He continued in the same condition for three days, and died on the thirtieth.

On a post mortem, examination the digestive apparatus was found healthy; the large intestines filled with meconium; the left lung was crepitant and slightly engorged with blood; the right lung was hepatized in almost all its extent; there existed at its base, a spot about the size of a large nut, where the pulmonary tissue was reduced to a red pultaceous mass; the bronchiæ were red and thickened, and contained a quantity of thick puriform mucosity, mixed with streaks of blood. The heart was gorged with blood; the ductus arteriosus was open, and the foramen ovale had begun to close; the cranium was not examined.

It is evident that this advanced disorganization of the lungs was an effect of pneumonia existing at the time of the birth of the child. The state of marasmus, extreme feebleness, and difficulty of respiration, were the result of this congenital pneumo-

nia, the increasing progress of which arrested the first phenomena of life.

A simple pulmonary congestion may occur in an infant during its sojourn in the uterus, and give rise, at birth, to an impediment to the introduction of air into the lungs, and consequently prevent the establishment of respiration.

Pleurisy may also be developed before birth, as may be seen by the following example :

CASE LXIV.—*Congenital pleurisy*.—Henriette Sauvace, aged two days, entered the infirmary on the 4th of October. She was pale and thin, and respired with great difficulty; the pulse was of a remarkable irregularity; the expression of face was every moment very much altered; the chest gave a dull sound on the left side, and the air could scarcely be heard with the stethoscope to penetrate the lungs at the superior part of the thorax. (*Gummed barley-water, abstinence from the breast.*) On the fifth, the child was in the same state, and on the sixth she died. On opening the body, both the costal and pulmonary pleuræ were found spotted, of an obscure red. This membrane, particularly at the part where it lines the ribs, exhibited considerable thickness, and there existed between it and that of the lungs, cellular adhesions, as solidly organized as they are often found to be in adults eight or ten years after the existence of pleurisy. The pleura also presented a number of small granulations, and there were also adhesions much more recent than the preceding, for they were still of an albuminous consistence. The pulmonary tissue of this side was much engorged; the foetal openings still existed; the brain presented nothing remarkable; in the ileo-cæcal region there were found fifteen very projecting dark-colored follicular plexuses.

This child, then, was born with chronic pleurisy, which was doubtless the cause of the extreme feebleness, for which, perhaps, it might have been thought necessary to administer tonics, whilst in truth the first thing required would be to attempt to combat the phlegmasia which so quickly terminated her life.

The facts which I have stated prove the possibility of an infant being born with congenital pneumonia or pleurisy, and they ought to direct our attention to searching for the causes of feebleness of birth, in order to render the proper attention to young infants.

§ II. DISEASES OF THE LUNGS AND PLEURA DEVELOPED DURING OR AFTER BIRTH.

If a disturbance of the functions of an organ constitutes a disease, the difficulty or impossibility of the establishment of these functions ought also to be regarded in the same light. It is not only when an anatomical lesion or a physical cause, appreciable by our senses, suspends the physiological exercise of an organ, that art should be resorted to; it is sufficient that any obstacle to the development of life should exist in the different parts of our bodies, for us to require assistance from the different means which science places at our disposal, for the removal of immediate or remote causes which oppose the free development of our functions.

The lungs of a new-born child, which, during intra-uterine life, are only organized in a manner suitable for the reception into their cells of the air and blood which are to pass into them at the beginning of independent life, present to our notice, at the period of birth, phenomena worthy of attention. For the most part, they at once and without embarrassment fulfil their new functions; at other times, respiration is not established, and the air does not reach the pulmonary cells. M. Capuron has remarked, with much reason, that very different states of the circulatory and respiratory apparatus which prevent the establishment of life, have been vaguely denominated asphyxia.* I will designate then the condition of new-born children now under consideration, by the title of *imperfect establishment of respiration*.

The experiments of Haller, and those more recently made by Béclard,† have demonstrated that the child, during its sojourn in the uterus, exercises in the midst of the waters of the amnios movements of inspiration and expiration; of course no air can enter during this first act of the respiratory apparatus. It is also possible that these movements continue after birth with too little energy for the air to enter the lungs, either because the cells of this organ do not dilate, or that the bronchiæ are closed with mu-

* Capuron, *Traité des maladies des enfans*, p. 14.

† *Dissertation inaugurale*.

cosity, more or less thick, adherent to their sides. Yet the child may live in this condition some hours, or even days; and if the lungs be examined after death, not the least trace of air will be found in them.

I have had the opportunity of examining six infants who had lived without air having penetrated their lungs in sufficient quantity to prolong their lives. They were all remarkable for extreme feebleness, the slowness of their movements, the peculiar alteration of their cry, which consisted only of an acute hiccup.

CASE LXV.—Three children born at one birth, were brought to the Hospice des Enfants Trouvés on the 21st of October, 1826; the smallest, who was a female, attracted my attention by the slowness of her movements, her sinking condition, and the peculiar nature of the cry, which consisted only of an interrupted sound of the re-prise. The chest did not rise or fall regularly, and gave, on percussion, a dull sound in all its parts; the stethoscope did not detect the sound of respiration. The heart beat fifty times in a minute. A few spoonfuls of sweetened water were given; she was kept warm, and dry frictions were applied to the chest; the child, however, died eight hours after birth.

The post mortem examination was made the next day. The umbilical cord was found still soft; the trachea having been tied at the larynx, the heart and lungs were immersed in water; they at once sunk to the bottom of the vessel; yet their tissue was not engorged; the right lung only at its posterior border presented a slight congestion. Each lobe was then separated and placed in water, and sunk to the bottom with equal quickness. The heart was filled with blood; the fœtal openings were still free.

Respiration, therefore, was not established in this child, or at least the air had only penetrated to the commencement of the bronchiæ. Death ensued not from asphyxia, but from defect in the establishment of respiration.

It is not usual to meet with so complete an absence of air in the lungs of infants, who, like the one just mentioned, live for some time, as it were, the embryo life, either because the blood preserves its vivifying principle which it received from the mother, or that the oxygen of the air absorbed by the skin or mucous membranes penetrated into the circulation, or that this es-

sential element of life is not at this time of so great importance as it is afterwards. A great portion of the lungs is found destitute of air in those infants who, far from exhibiting a general congestion, as is the case in true asphyxia, present, on the contrary, an excessive paleness and debility. This is the condition that really merits the name of feebleness of birth, and which it is necessary carefully to avoid treating by bleeding.

The child ought to be placed in such a position as to leave the mouth and nose uncovered, and in a situation to receive a current of fresh air. Dry or aromatic frictions should be used on the thorax, and care must be taken to prevent the clothes from being tight around the thorax or abdomen. The child must be fed with a spoon instead of the breast, for sucking will be extremely difficult when respiration is not completely established.

Asphyxia, properly so called, always coexists with a greater or less congestion of the heart and large vessels; the air sometimes passes freely into the lungs at the period of birth, but the sanguineous congestion which occurs immediately, expels it or hinders it from penetrating in sufficient quantity to effect a complete establishment of life. There exists, as is well known, between the circulation and respiration, an intimate and reciprocal relation, which is evident during life, but more particularly so at the time of birth. Some children are born in so great a state of plethora, that all their organs, especially the heart, liver, and lungs, are affected with congestion to a considerable degree, and this congestion increased in the lungs by the restlessness and cries of the child, and perhaps by the respiration of heated air in a small room, warmed by a stove, the suspension of respiration and a true asphyxia may follow. The face under these circumstances is usually purple, the pulse scarcely perceptible, and the cry smothered. Many children born in this condition, make at first some movements of inspiration and expiration, utter some sound, and remain in a state of asphyxia. Others are born inanimate, do not respire, and the air does not penetrate the lungs because the air cells are filled with blood. This state of turgescence occurs most often in cases of difficult and protracted labor, and the best means to relieve it is to allow the blood to flow from the umbilical cord as much as possible. The utility of this precaution is so apparent, and so naturally occurs to the mind, that

it has become a daily practice, and on this account hardly needs to be recommended here. The custom of endeavoring to excite the cries of the child in order to effect a movement of the thoracic parietes and of the lungs, ought to be condemned: for possibly during the act of crying the movements of the heart are quicker, and the blood may flow in great abundance towards the lungs. It would be better, I think, if this state continue, to apply one or two leeches to each axilla, and to use cautiously dry or aromatic frictions to the thorax. If tonic bathing is necessary, it would be more useful in the preceding case than in true asphyxia; let us, therefore, endeavor to distinguish from each other the various causes which oppose the establishment of respiration in new-born children, and only use with discernment the means proper for the treatment of those effects which result from them.

We must not neglect to satisfy ourselves that there is not an accumulation of serosity in the larynx and bronchiæ, which will become an obstacle to the establishment of respiration, and if it be found to exist, it must be removed with the fingers or a feather, to effect a free passage to the air cells.

Such, in general, are the symptoms which appear on the part of the lungs during birth; we shall now investigate the diseases with which the lungs, bronchiæ, and pleura, may be attacked after birth.

ART. 1.—Congestions and Pulmonary Apoplexy.

The lungs may, after birth, often become the seat of considerable congestions, producing the most serious consequences. The anatomical characters of those congestions vary from a simple sanguineous infiltration to a complete pulmonary engorgement. It is difficult sometimes to draw the line between the effect of a congestion, and that produced by an inflammation in the pulmonary tissue. Yet the following are some of the anatomical characters of congestion, or pulmonary engorgement, in young infants.

That the pulmonary tissue which the air has not penetrated may not be confounded with that which is engorged or hepatized, it will be necessary to remember the observation already made of the striking resemblance between the thymus gland and the

lungs of an infant that has not respired. This comparison ought to be made in order to assure ourselves of the state of the lungs in a post mortem examination, when it is supposed that the child has not breathed.

Engorgement is more frequent at the posterior part of the lungs, and at the Hospice des Enfants Trouvés it is found more often in the right than in the left lung. The tissue of the organ preserves its texture and solidity; it is only infiltrated with a large quantity of blood, and is easily deprived of its color when immersed in water; sometimes it happens, but not always, that the bronchiæ, in the midst of this engorged tissue, are red and covered with a sanguineous exudation. Pulmonary engorgement is almost always accompanied with a sanguineous congestion of the heart and large vessels, a circumstance which it is necessary to remember when we wish to distinguish engorgement from hepatization of the lungs.

The causes of engorgement almost always arise from some disturbance to the course of the blood through the heart and large vessels. It sometimes continues for a long time after birth, and appears to be the remote result of a stagnation and superabundance of blood in the heart and lungs during birth.

The symptoms of pulmonary engorgement in an infant are, in general, very obscure, and consequently difficult of observation; yet we may point out the following: The respiration is labored; the thoracic parietes are not perfectly developed; the face is purple; the general color indicates a sanguineous plethora in all the organs; the cries are obscure, painful, and short; percussion yields a dull sound, especially if, instead of striking the anterior part of the chest, the child is exposed, and, as it were, suspended, by the anterior part of the chest being applied to the hand, while small blows are struck on the back and lateral parts of the thorax with the index or middle finger of the other hand. M. Baron uses this kind of percussion with great skilfulness; the facility he has acquired of distinguishing the different sounds in the chest, enables him often to make very accurate diagnosis on the diseases of the thorax in very young infants. The importance of this species of examination cannot be too much impressed on the minds of practitioners, for in infancy it is much more useful

than mediate auscultation, especially when there exists a simple pulmonary engorgement.

The treatment of this affection being the same as that of pneumonia, of which it is often the first stage, we must refer to the history of that disease for the necessary details of the management.

Pulmonary congestion or engorgement may be the cause of several affections or lesions in the tissue of the lungs, but more especially of pulmonary apoplexy.

Pulmonary apoplexy.—This is of more common occurrence in new-born children than in adults or old people; the frequency of congestion of the lungs at this period of life, satisfactorily explains this fact. It consists of an effusion of blood circumscribed in the middle of the tissue of the lungs; it may occur suddenly or slowly, according to the abundance of blood flowing towards the organ and the intensity of the cause which determines this afflux. This disease, first pointed out by Laennec, has since been described by M. Gendrin and M. Bouillaud, who have published some interesting observations on the subject.* I have often met with it in young infants, and M. Denis has also mentioned it in his work. I will here give some cases of it.

CASE LXVI.—Francoise Rédon, aged three days, entered the infirmary on the 20th of April, for a diarrhœa accompanied with icterus diffused over the whole body. On the twenty-sixth, the child became very feeble, and passed an abundance of green matters from the bowels. On the twenty-eighth, he vomited the drinks; the cry was smothered, and the chest was sonorous only on its right side. On the 3d of May, the same general state continued, but the face was puffed, and the icterus had disappeared; death occurred at night. The internal membrane of the glottis was found intensely red, with a slight pellicular exudation. The right lung was crepitant; the left was so at its circumference; but in the centre of its tissue there were found three small circumscribed sanguineous effusions; the pulmonary tissue was hard, and, as it were, hepatized at its circumference.

CASE LXVII.—Auguste Bonnet, aged two days, had not ceased

* *Observations pour servir à l'histoire de l'apoplexie pulmonaire*, by J. Bouillaud, *Archives générales de méd.*, 1826.

crying since his birth; he was feeble and small, and affected with icterus; the temperature of the body was very low; at every moment he was seized with suffocation, which threatened his death; the face became purple and puffed; the cry was almost entirely stifled; the pulsations of the heart were tumultuous and irregular; respiration could not be heard except at the upper part of the thorax, and it gave, on percussion, a dull sound in almost every part; the same state continued until the 3d of October, when the child died while vomiting frothy and bloody matters.

Post mortem examination.—Extensive congestion of the base of the tongue and thyroid gland; the same condition of the œsophagus; a well-marked injection of the intestinal tube, which was covered interiorly with thick mucosity; the liver was gorged with blood; the bile was clear and not very abundant; the left lung was crepitant, although infiltrated with a quantity of blood; the right lung appeared black externally; when immersed in water it soon sunk to the bottom of the vessel, and when cut a large quantity of blood was found effused in clots, and separated by intervals where the tissue of the lungs did not crepitate, and consequently appeared not to have been penetrated by air; the foramen ovale was obliterated, and the ductus arteriosus was still open; the bronchiæ were full of bloody mucosity, which even extended to the trachea and larynx; there was but little serosity in the ventricles of the brain, the substance of which was yellow and a little softened.

It is evident that, in these two cases, the suffocation, the general condition of the children, the alteration of the cry, the swelling and purple color of the face, and finally death, were caused by the sanguineous effusion in the pulmonary tissue, which the air had with difficulty penetrated. In a third child exhibiting the same symptoms, aged ten days, I found a much greater lesion in the pulmonary tissue, for in the right lung there appeared two large spots of black liquid blood, around which the pulmonary tissue had begun to soften; the foetal openings were still free, and the right cavities of the heart were more dilated than the left; the brain was much engorged with blood.

We may therefore conclude from the preceding facts, that pulmonary apoplexy may succeed congestion of the lungs, or may accompany this condition; that the most prominent symptom is a suffocating cry; that percussion indicates the absence of air in

the affected lung, and that there is sometimes an expulsion of bloody mucosity.

The first indication to be fulfilled is the abstraction of blood, which can best be done by the application of one or two leeches under each axilla; the subcutaneous venous plexuses in this region communicate directly with the vessels of the thoracic cavity, and are thus convenient for the sudden evacuation of blood from the affected part. It is of the greatest importance to avoid clothing too tightly a child that presents these symptoms, either at birth or at a more advanced age, for by impeding the dilatation of the thorax, there is danger of augmenting the congestion. As to other and subsequent treatment, they will be found under the head of pneumonia.

ART. 2.—Pneumonia.

Pneumonia of infants exhibits peculiar characters, in which it differs from the same affection in adults. Instead of being an idiopathic affection, arising from irritation developed in the pulmonary tissue under the influence of atmospheric causes, which often excite this disease, the pneumonia of young infants is evidently the result of a stagnation of blood in their lungs. Under these circumstances, this blood may be regarded as a kind of foreign body, and it concurs in producing an alteration in the pulmonary tissue with which it combines, and is identified with it so as to form what is called a hepatization of the lungs. In proof of this, it is known that pneumonia almost always follows congestion or engorgement of the lungs, and as this engorgement is more frequent in the right lung than in the left, and at the posterior border of the lungs than in any other part of the organ, pneumonia appears much more frequently in the right than left lung; at least it is so with respect to the children which I have examined at the Hospice des Enfants Trouvés, who are always placed at rest on the right side. It would therefore appear that inflammation of the lungs which produces hepatization, arises, in infants in general, from some mechanical or physical cause, whilst this is not the case in adults; besides, the inflammation of the lungs is ordinarily very circumscribed, and is found almost always confined to a point primarily engorged, and the pleura,

which, in the greatest number of instances, is inflamed at the same time with the lungs, at a more advanced age, is not affected in young infants.

The inflammation, once developed, may give rise to various alterations of tissue, the shades and different degrees of which vary from simple hepatization to a great disorganization of parts. We will commence by detailing cases.

CASE LXVIII.—Emilie Tavenne, aged five days, entered the infirmary on the 20th of September; she was small and feeble; the integuments were very red; had a diarrhœa of yellow and green matters; the cry was feeble, and at times could scarcely be heard. (*Gummed rice water, starch injection, milk and water.*) On the twenty-second, the face became livid, and expressive of pain; the alæ of the nose were drawn outward, and they were surrounded with a violet-colored circle; the cry was painful, and almost always husky; the thorax gave a dull sound on the right side, where respiration could not be heard. (*Gummed decoction of marshmallows, sinapised pedeluvium.*) On the twenty-third, there appeared to be no febrile reaction; the limbs were cold and œdematous; the pulsations of the heart were so obscure that it was impossible to count them. The child died on the twenty-fourth. On opening the body, red streaks were found in the stomach and at the commencement of the small intestine, and fifteen follicular plexuses, red and tumefied, at the inferior portion of the ileon. The commencement of hepatization appeared in the left lung at its superior lobe; the right lung was hepatized throughout its whole extent; its pieces, when cut, did not present a true cellular texture, and sunk rapidly to the bottom of the water; the pleura was perfectly healthy; the fœtal openings were obliterated; the bronchiæ were red and filled with blood; the brain and meninges were very much injected.

It will be observed that there was no symptom of reaction in this child, but the local symptoms were very well defined, and not severe. It is then to the latter, that the physician ought to direct his attention in order to make a correct diagnosis of the disease. The subject of the following case was more advanced in age, and the symptoms present a new character, which are to be attributed to the modifications which age produces in the organization.

CASE LXIX.—Joséphine Oudon, aged seven months, entered the infirmary on the 8th of June, for a gastro-intestinal inflammation developed five days after having been vaccinated, which however yielded to the application of three leeches to the epigastrium, bathing, and demulcent drinks. While convalescent from this disease, she was on the twenty-second of June, suddenly attacked with a frequent dry cough, accompanied with great restlessness. There occurred at the same time an intense redness on the left cheek; the skin was burning; the pulse very frequent; respiration laborious, without any râle; the cry which was constantly husky, became stifled whenever the child had cried much; the face changed color, became pinched, and appeared also to swell and to become purple whenever the child began to cry. (*Three leeches to the upper and lateral parts of the thorax, gummed barley-water.*) The leech-bites bled copiously, and produced syncope. On the twenty-eighth, blood oozed from the left eye. In the evening of the 1st of July, there supervened fever and restlessness, accompanied with a slight cough, without expectoration; there existed no râle; the thorax was dull on the left side. From this time to the 10th of July, the same symptoms continued; the child gradually sunk; the pulse became threadlike and very frequent; and the face was covered with petechial spots which continued several days. The same state continued until the period of death, which took place on the eighteenth.

Post mortem examination.—There was great emaciation and universal paleness; the stomach was colorless, but without being softened; six follicular plexuses, of a very intense red, were found at the extremity of the ileon, which was also very much injected to the extent of eight inches; the right lung was hepatized at the posterior border, and the whole of the inferior lobe of the left lung was in the same state. It presented a smooth surface when cut, and the pieces which were not cellular, and which could be pressed between the fingers without yielding any blood, fell like a stone to the bottom of the water. The bronchial ramifications were filled with slightly red and frothy mucus; the trachea was healthy; the heart and brain presented nothing remarkable.

We have seen in this child not only the local symptoms of pneumonia, but also those which ordinarily produce febrile reaction occasioned by phlegmsiæ of the principal viscera. Cough, which was absent in the former case, was in this added to the

other symptoms; but, as in the other instance, there was no expectoration, which indeed is impossible, or at least very difficult in young children; they vomit much sooner than they expectorate, a phenomenon produced almost always by the sudden action of the diaphragm on the stomach, on coughing. The examination of the organs also enables us to discover nothing more than simple pneumonia, without the complication of pleurisy, which, I repeat, is very common in young infants.

Abscesses in the lungs caused by pneumonia is very rare in adults, where suppuration is not usually observed to exist, in a circumscribed spot or focus, but disseminated and infiltrated in the tissue of that organ; pulmonary abscess is equally rare in infants; yet they may occur, as may be seen by the following case.

CASE LXX.—Théophile Champion, aged three months, had been twice in the hospital since birth: the first time for an œdema of the limbs; the second for enteritis with green diarrhœa, complicated with a cough. These symptoms, however, yielded to simple means, and the child was confided to the care of the ordinary nurses; but on the 2d of March, he entered the infirmary for the third time. He was pale and very thin. There was no diarrhœa; the abdomen was tympanitic, but without pain. He was affected with constant cough, and the respiration was loud; the thorax resounded badly throughout, although it did not give a positive dull sound in any part. (*Sweetened barley-water, milk and water.*) On the 10th of March, he appeared to be much better, or at least the respiration was more free; the cough however continued, although he had no fever; on this apparent improvement, the nurse took charge of him; but the cough returned the same night, accompanied with suffocation, and the cries of the child, which could be heard only for a moment, expressed the greatness of the suffering. He re-entered the infirmary at eleven in the morning; the cough was frequent and dry, the face purple, the alæ of the nose drawn outward, and were surrounded by a blue circle, which was also observed at the root of the nose; the cry was plaintive and distressing; the left side of the thorax gave a dull sound, and the respiration could not be heard; the limbs were cold and the pulse small and irregular. (*Milk and water, sinapism to the feet.*) On the thirteenth, the eyes became hollow; the respiration was hurried, and the other symptoms con-

tinued the same. The same condition continued until the sixteenth, when death occurred towards evening.

Post mortem examination.—The stomach showed a white softening in its whole extent, and near the cardia exhibited several superficial erosions. The same state existed throughout the whole extent of the intestinal tube, which was covered with yellow porraceous matters. The liver was healthy, but the gall-bladder was filled with black viscid bile.

At the base of the left lung, there was a collection of pus about the size of a filbert, white and thick, but without odor; the internal surface of the cavity containing this pus, was even and red, but did not appear like a cyst. The right lung was healthy; the fœtal openings were obliterated; the brain was healthy, but the meninges were injected.

We have reason to think that this child had been affected with pneumonia for a long time, with symptoms obscure, it is true, but which were sufficient to fix the attention of the physician; the nurses who only observed in this infant the paleness and debility, withdrew him from the care and attention of the physician, when they discovered what they believed to be a melioration of the symptoms, which could only deceive persons unaccustomed, as they were, to the art of observing the sick. The inflammation had made a slow but steady progress until suppuration occurred in the affected organ. This case proves how necessary it is to be constantly on our guard in cases of obscure phlegmasiæ, which in infants, much more often than in adults, may produce the most serious lesions without a suspicion of such an event on the part of the physician.

I have seen in the dead body of an infant, aged twenty days, that died without exhibiting any evident symptoms of pneumonia, the right lung hepatized in almost its whole extent, together with three white, soft, and elastic projections on the base of this lung and on its middle lobe, which on being opened discharged a quantity of air, and immediately collapsed. They were formed by a very thin cyst, which contained white, inodorous, thick, and stringy pus. The internal surface of these cysts was red and granulated; it was confounded posteriorly with the tissue of the lungs. The bronchiæ did not open into them: they were inflamed, and small drops of pus, like that

just described, oozed out on pressure. The other organs presented nothing remarkable.

It is evident that this suppuration of the bronchiæ, and the abscess of the lung, were the result of a latent phlegmasia, the symptoms of which had escaped my observation, not having bestowed sufficient attention for that purpose.

Inflammation of the lungs may not only produce hepatization and suppuration, but also its softening or disorganization, which is noticed also to arise under the influence of inflammation in other organs.

CASE LXXI.—Rony was exposed immediately after birth, on the 7th of February, at the Hospice des Enfants Trouvés. He was immediately placed under the care of a nurse, and took the breast with eagerness; he soon stopped sucking, because he appeared to become smothered every instant; the face became purple; he attempted to cry, without being able to do so. He was fed with a spoon. This condition continued the same, but in addition to the other symptoms, he vomited almost continually; had a smothered cry; the stools were natural. Death occurred on the eleventh. As this child was not sent to the infirmary, I was unable to observe him very closely, but it was from the relation of the nurse that I obtained the foregoing account. On examining the body after death, I noticed the commencement of the discoloration of the mucous membrane of the intestines; the heart, liver, and large vessels were filled with blood; the left lung was considerably filled with blood at its posterior border, which was found in a state approximating to hepatization, while the remainder was reduced to a reddish, diffuent, soft mass. This mass yielded no odor of sulphuretted hydrogen, and when diluted with water exhibited grayish pulpy clots, which appeared to be the effect of the disorganization of the lungs. The bronchiæ were a little more red in their remote branches; they were healthy and white where they first diverge. The right lung was simply engorged.

This disorganization of tissue appeared to me to be the result of pneumonia, which, perhaps, had succeeded a passive congestion, as is often observed in new-born children. Whatever may be the cause, it should convince us of the necessity and importance of observing the symptoms of pneumonia in young infants,

since this disease may, even at this age, be followed with fatal effects.

Before exhibiting the general assemblage of symptoms of pneumonia, let us study the disease as complicated with pleurisy.

Pleuro-pneumonia.—I have already remarked that this was much more rare in infants than in adults. It is principally in children that are somewhat advanced in age, that it is to be found; the disease is then, not the effect of pulmonary congestion, as in simple pneumonia of new-born children, but is the result of the direct or remote action of the atmosphere, or of other external causes.

CASE LXXII.—*Pleuro-pneumonia.*—Honoré Lucet, aged five months, entered the infirmary on the 5th of May. He had already a month previous been admitted for enteritis, which had been cured. He nevertheless continued pale and thin. He was now affected with considerable tension of the abdomen, and vomited all his drinks: the respiration was labored; but the cry exhibited no alteration, but had become weakened by its frequency. On the sixth, the face assumed a painful expression, and from being habitually pale, became livid; the vomiting did not cease. On the seventh, there was great restlessness; the limbs became stiff, and remained in a state of spasm; the cries could scarcely be heard; the chest gave a dull sound on the right side, but resounded well on the left; the pulse was slow in the morning, but in the evening it rose to one hundred and forty beats in a minute; a general sweat supervened, and the limbs, which during the day had remained contracted, again became flexible. (*Milk and water, four leeches to the left side of the chest.*) On the eighth and ninth, there was a slight melioration of symptoms, for the cries and restlessness of the child were less violent; but on the tenth, all the symptoms returned, and the face bore the expression of extreme suffering. On the eleventh, a layer of muguet appeared on the buccal parietes, and on the twelfth, the child expired.

Post mortem examination.—There was a white softening of the whole of the intestinal mucous membrane, redness of the glottis, a healthy state of the trachea, and a hepatization of the right lung in its entire extent. Between the two pleuræ of this side, there were adhesions which already possessed some degree of firmness; there was but a small quantity of sero-purulent fluid effused in the cavity

of the thorax; a part of the right lung was of a gray slate-color; in the centre there appeared a reddish softening, and the bronchiæ of this lobe alone contained puriform mucosity; the brain was healthy, and when cut, exhibited a smooth, firm surface; neither the spinal marrow nor the meninges exhibited any appreciable alteration.

This child, with the exception of the excessive pain which he had experienced, and of which the contraction of the limbs was perhaps the secondary effect, exhibited no other symptom than those of pneumonia; so that it seems to me very difficult to distinguish pneumonia from pleuro-pneumonia in very young infants. This distinction, however, is not of much utility, since the treatment of the one is perfectly applicable to the other.

We are now able to recapitulate the symptoms of pneumonia and pleuro-pneumonia in children at the breast.

Respiration is laborious, short, painful, and cannot be heard by auscultation in the portion of the lung, or in the lung that is hepatized; the chest gives a dull sound on percussion; breathing is sometimes suffocating, and the râle is not always heard.

The cry is incomplete, and almost always smothered; becoming clear for a moment, and returning afterwards to the alteration in the tone which we have mentioned. The reprise usually exists, and it is more particularly the cry which is wanting, or which is not heard as in the natural state.

Cough is sometimes present, but this is not always the case, and demands but a secondary attention.

Expectoration does not exist, and cannot here, as in adults, enlighten us as to the nature, seat, and stage of pulmonary phlegmasia; the same may be observed with regard to pain in the side. Bloody vomiting is rare.

The peculiar expression of the face in diseases of the chest consists in a drawing of the alæ of the nose outward, and which the child appears to dilate with great effort, and more especially in a blue circle around the lower part of the nose and commissure of the mouth, and which is doubtless the result of a great disturbance in the general or capillary circulation. Those wrinkles on the forehead which are to be observed in abdominal affections, less frequently exist. Yet the nasal and the genal lineaments are frequently observed; the face sometimes becomes

œdematous, particularly at the termination of the disease. Febrile re-action scarcely, if ever, occurs in very young infants, but appears in proportion as the child advances in age; the pulse is often small and obscure, the skin cold and livid, and the limbs are œdematous.

As pneumonia is developed very often after pulmonary congestion, and as the latter occurs in strong children, that are plethoric, the patient affected with pneumonia has often a high color, and is swelled or œdematous. If the disease continues for some time, a state of marasmus ensues, which is common to chronic phlegmasiæ in general.

Such are the most common symptoms of pneumonia in children at the breast. It can easily be conceived, however, that they may offer several modifications in different infants, and especially at different ages, and which can only be learned by close observation of the sick.

Treatment.—Children affected with pulmonary congestion or pneumonia ought, in the first place, to have all tight clothing removed. Immediately upon the appearance of symptoms of pulmonary congestion, two, four, or six leeches, according to the strength of the child, ought to be applied to the base of the chest, or under each axilla. The child should not be placed in a warm bath, because the heat and pressure of the fluid will augment the afflux of blood towards the thorax, and increase the labor of respiration. The child must be kept from the breast for twenty-four or twenty-eight hours, giving in its place some milk and water, or milk of almonds. If the inflammation continue after sanguineous evacuations, recourse must be had to dry cupping on the thorax, or to irritation or blistering either to the chest or arms. Revulsives to the extremities or to the intestinal tube may be employed to diminish the difficulty of breathing. If the pain be excessive, producing continual restlessness and crying, it will be advantageous to give a small quantity of syrup of poppies in two ounces of linctus. Anatomical researches have proved that pneumonia in young infants is always the result of sanguineous congestion; that it is purely local, and that often the bronchiæ do not participate in the inflammation. Consequently there can be but little benefit derived from the use of syrup of ipecacuanha, kermes mineral, or even of squills, usually

given in these affections, in order to produce an expulsion of mucosity. Besides, it is well known that in new-born children there is no expectoration. Under the supposition, then, that these medicines excite the bronchiæ, the child may by their use be teased with desires which it cannot gratify. But at a more advanced age, and when there exist symptoms of bronchitis, there may be given with advantage, particularly in the latter period of the disease, half a grain of kermes mineral in two or three ounces of water, by the tea-spoonful. M. Dugès, who has given some excellent precepts on the treatment of pneumonia, advises the use of a mixture, made with two drachms of oxymel of squills, and an ounce of gum syrup and orange-flower water. We should be careful not to administer syrup of ipecacuanha in every instance in which a child coughs, without ascertaining the nature of the cough, together with the local or general symptoms which exist at the same time. In the use of medicines in general, we must not lose sight of the importance, while meeting the symptoms, of considering the nature, seat, and modifications of the various lesions which produce them.

If the child continue debilitated, after an attack of pneumonia, if for a long time it experience a disordered state of the system, which appears to arise from the remnant of irritation in the thoracic organs, it will be necessary to use the most assiduous care to prevent a return, by covering the skin with flannel, by removing it from all the causes capable of exciting afresh the respiratory apparatus, such as too frequent cries, the exposure of the child to cold air or violent wind; by walks, or by a residence in humid places, as valleys, or the bank of a river, etc. We should remember that this is a period of life at which the different organs are susceptible in their progress of development, of acquiring certain modifications which dispose them to idiosyncracies, the influence of which may remain during life. How often do we see children born with all the appearances of flourishing health, almost always become feeble and sickly from diseases which attacking them in their early infancy, leave after them vital or organic modifications which time can scarcely remove, and which in some individuals never disappear! Far be it from me to yield to ridiculous prejudices; but without admitting the remains of measles, whooping-cough, or thoracic effusions,

to which a thousand distressing symptoms are vulgarly attributed, cannot it be easily conceived that it may be possible that a hepatized lung, or bronchiæ that have suppurated, will for a long time, if not always, preserve the traces of the pathological modifications supervening in their tissue, and thereby become less suitable to fulfil their functions? It is perhaps to pneumonia developed during intra-uterine life, or after birth, that short breathing, husky voices, asthmas, or idiopathic coughs, with which some individuals are affected, are to be attributed. This supposition will appear less strange, if the numerous lesions to which our organs are exposed from the first moment of their formation are considered.

ART. 3.—Bronchitis, or Bronchial Catarrh.

Inflammation of the bronchiæ may exist in new-born infants without producing any well-marked symptoms. I have, in four instances, seen the remote ramifications of the bronchiæ very red and filled with thick mucosities, in the body of a child who had died eight or ten days after birth, and where there had neither been any râle nor cough during life. In two of these children there was pneumonia with pulmonary engorgement; in two others the lungs were healthy, and death occurred from intestinal phlegmasia. But bronchitis is not always so obscure; for the most part it is easily recognised, and the diagnosis of the symptoms is much more easily made as the child advances in age. The following is an instance of an infant of fifteen days, with symptoms of acute bronchitis, with its peculiar characters strongly marked.

CASE LXXIII.—*Acute Bronchitis*.—Michel Colot, aged fifteen days, of a strong constitution, not having been sick from the time of birth, was, on the 22d of November, taken with a violent cough, accompanied with a râle which could be heard without recourse to auscultation. Respiration was frequent, the chest was sonorous throughout; the skin was burning; the pulse small and frequent; an erythema appeared on the posterior part of the thighs. (*Gummed decoction of marshmallows, pectoral electuary, milk and water.*) On the twenty-sixth, same condition; face pale and œdematous; the child slept but little and cried much. There was an incessant cough

accompanied with danger of suffocation, which continued for some minutes. On the twenty-eighth, respiration could be heard better on the right than on the left side, where percussion produced a slightly dull sound. The same treatment was continued. On the twenty-ninth, the integuments of the face and trunk became livid; the mucous râle was very distinct; the cough was very frequent, and accompanied with imminent danger of suffocation; the child became very restless; a copious diarrhœa occurred; the abdomen was soft; the skin burning hot; the pulse small but of extreme quickness; finally, death occurred on the night of the twenty-ninth.

On a post mortem examination the mouth and œsophagus were found pale; the stomach contracted, wrinkled, and streaked with red; the left lung infiltrated with blood; all the bronchial ramifications were very red and tumefied, and were found filled with thick, reddish, filamentous mucosity; the right lung was likewise engorged; the bronchiæ, like those of the left lung, were red, and filled with thick, yellow, ropy mucosity; the heart was healthy; the fœtal openings still free; the brain firm; all the tissues were in general gorged with fluid and dark-colored blood.

When bronchitis supervenes on pneumonia, the smaller divisions of the bronchiæ are the parts that are inflamed. It even happens that the first ramifications near the trachea do not participate in the inflammation. Wherever the seat of the inflammation is, it is sometimes accompanied with very serious symptoms, which arise from the difficulty with which the air penetrates the lungs. I have seen, in several children, bronchial catarrh give rise to all the symptoms which authors have referred to suffocating catarrh, and which M. Gardien observes is the result of an infiltration of serosity in the pulmonary tissue.* The suffocation with which the child is threatened appears to me to be the effect of several modifications of the phlegmasia of the air passages; its cause is not always the same; it is sufficient for its occurrence that the phlegmasia has produced some obstacle to the passage of the air. We have already seen this morbid phenomenon arise in several instances, and it can, without doubt, be pointed out on several other occasions.

Bronchial catarrh may pass to a chronic state, and cause, for a long time, a secretion of mucosities from the trachea and bron-

* Gardien, *Traité des Maladies des Enfants*, t. 4, p. 302.

chiæ. It is often, in children, symptomatic of phlegmasia of the pulmonary tissue. Sometimes, indeed, it is accompanied with tubercles situated in the lungs or root of the bronchiæ; in every instance it gives rise to a series of peculiar symptoms, and which enable us to recognise it. Such, for instance, in infants that have attained the age of ten months or a year, as constant cough, oppression, quick noisy respiration, very evident mucous râle, fever, continual heat of the skin, paleness and tumefaction of the face. To these symptoms there is often added an inflammation, more or less intense, of the digestive tube, the mucous membrane of which is disorganized, without color, and is even sometimes softened. I have found the mucous membrane of the trachea and bronchiæ, in several infants that have died of chronic catarrh, covered with red streaks, whilst the bronchial ramifications presented a uniform and intense redness, and were at the same time filled with thick and adherent mucosity.

Acute bronchial catarrh in new-born children may be of very short duration; it sometimes arises without any appreciable cause, and disappears spontaneously at the end of a few days. There is very often no other symptom than the mucous râle, or short, noisy, and frequent respiration, without any well characterized râle. In older children it is in general more obstinate, and always produces cough; some children will even retain it for a very long time, and will pass through the period of suckling without being freed from it, and without experiencing any serious injury to their health; in general, chronic bronchitis need not be regarded as a serious affection when they do not become emaciated, when they preserve the appetite, and the usual gaiety and vivacity of their age. The usual termination of bronchial phlegmasia is resolution; I have found but once, on examining the dead body of a child, that I had not seen during its life, a well-marked œdema of the bronchiæ; in another an abundant sanguineous exhalation: the ages of both were but five days.

The treatment pointed out for pneumonia will also be applicable to bronchitis, which is frequently accompanied by inflammation of the lungs. Yet it would perhaps be necessary in this case to make use of blisters more freely between the shoulders, or on the arms, particularly when the disease becomes chronic. When this is the case, we might also resort to the balsam of co-

paiba, in doses of a few grains each day, increasing the dose according to the age of the child. Dr. La Roche, a physician of Philadelphia, has met with great success in the use of this medicine. He has published an essay on the subject, which, while it contains a number of interesting facts, still leaves it evident that further experience is needed to confirm the efficacy of this medicine.* Mr. Thorn has made a resinous extract of copaiba, which is deprived of its essential oil, where the unpleasant taste and smell of this medicine reside, without removing its properties. Mr. Tyrrell has used this extract with great success in gonorrhœa in St. Thomas' hospital. It would probably be well to use it in the place of the balsam of copaiba when it is desired to administer it to children affected with chronic bronchitis, when the ordinary means have not succeeded in curing the disease.

ART. 4.—Pleurisy.

Pleurisy is more common among young infants than is generally believed; it often appears without the lungs participating in the inflammation. I have seen several infants die immediately after birth from this affection.

CASE LXXIV.—*Acute pleurisy*.—Averan, aged two days, was exposed at the Hospice des Enfants Trouvés, on the 14th of November. He was strong, and the integuments highly colored; the cry full and complete; he was constantly restless, and cried without ceasing; the face became purple and pinched; the child obtained no sleep at night, and appeared to suffer more when placed in the bed. On the morning of the fifteenth, the same state continued; the chest, when percussed, gave a dull sound in every part; at night the child became exhausted from fatigue, appeared to faint, and died. On opening the body the following day, the digestive tube was found healthy; the two cavities of the thorax contained a quantity of yellow serosity, in the middle of which were a number of albuminous flakes; there were no adhesions between the pleura; the two lungs floated on water, the left only was slightly engorged at its posterior border; the fetal openings were free; the meninges of the brain were healthy.

* La Roche, *On copaiba balsam in chronic bronchitis*. (North American Medical and Surgical Journal, No. VI, p. 34.)

The great restlessness of this child was, without doubt, owing to the development of pleurisy, and the pain, which the lying on the back made so much more distressing, proceeded from the effusion of serosity in the pectoral cavity. The signs of pleurisy were not well marked, and I have only given this example to show that restlessness, cries, sleeplessness, and death of new-born children may sometimes be owing to acute pleurisy. We will, however, observe that one of the signs of this disease is a dull sound of the chest, although the cry may not be altered. This would lead to the belief that if the disease exists in the thorax, the lungs are probably not its seat, since the air penetrates sufficiently in their tissue to preserve the cry in its normal state.

We shall see, in the following instance, pleurisy appearing in a manner more evident than in the foregoing case :

CASE LXXV.—*Pleurisy*.—Victoire Redan, aged ten days, strong and of a good color, and presenting all the appearances of health, entered the infirmary on the night of the 30th of October. This child had been vaccinated on the second day after birth; the pustule was not well developed, and there existed no inflammatory circle around it. She was attacked with an abundant diarrhœa of a yellow color. The face, which, until the time of admission, had been of a vermilion, was pale and wrinkled, particularly at the external angles of the eyes, and on the forehead; she cried but little, but the cry was plaintive. The pulse was very small, but exhibited nothing remarkable with regard to its frequency. On the 1st of November there was the same expression of face, the extremities were cold, trunk intensely hot; a marked dulness on percussion on the right side of the chest; the cry was expressive of fatigue, but without being husky; when the child was unclothed and examined, during respiration, the thorax was observed to dilate with difficulty, and that the movements of the diaphragm and parietes of the abdomen were very evident. (*Gummed electuary*.) On the 4th of November, there was an abundant vomiting, cry painful, limbs cold, face pale, and the alæ of the nose, which appeared to dilate with difficulty, were livid; the mouth remained open, or opened and closed alternately during the movements of respiration. Respiration could not be heard through the stethoscope at any point of the thorax, yet the dulness was not very evident on percussion, especially at the upper part of the thorax. (*Two leeches to the lateral*

parts of the thorax, linctus.) On the fifth, general sinking, extreme paleness, and death at night.

On examining the body, there was found a passive congestion at the base of the tongue and œsophagus, where were also found some spots of muguet, and softening of the mucous membrane of the small intestines.

The lungs were slightly red, and injected with a considerable quantity of frothy serosity, which flowed from every part when cut. The right lung exhibited the first stage of hepatization at its posterior border; a very fine spotted redness existed on the pleura of both sides; there was about two spoonfuls of serosity effused in each thoracic cavity, and the base of the lungs adhered to the diaphragm by tender albuminous filaments of a very slight consistence, of a citron color, like the effused fluid. The brain was healthy, but the ventricles were filled with serosity.

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We must again remark the restlessness and painful expression of the physiognomy of the child, the difficulty of respiration, the constantly increasing dulness of the thorax, although the cry did not become altered in proportion as the disease advanced; the coldness and lividness of the extremities, while the body was at a very high temperature. I will not speak of the pulse, which, in this disease, as in almost all others of new-born children, is very uncertain, and of little use in diagnosis. Notwithstanding all the care I have taken to ascertain correctly the symptoms, I am not able to offer any thing of sufficient precision to enable us to make a correct diagnosis of pleurisy; but the symptoms mentioned are at least enough to satisfy us that there exists a great probability of the presence of the disease now under consideration, and this is all we can obtain at the bedside, when we wish to ascertain the seat and nature of the diseases.

Chronic pleurisy.—Pleurisy may pass into a chronic state even in very young children, and give rise to changes in the tissue similar to those observed in adults. A little girl, aged three months, who had been feeble, pale, and sickly from birth, and who had been several times in the infirmary with the most uncertain symptoms, died at last on the 18th of April, 1826. She had insensibly arrived at the last stage of marasmus, and had not been affected with diarrhœa except in the latter period of life; she had never been affected with fever, and although the respira-

tion was short, the tone of the cry did not exhibit any alteration, and the nurse remarked that the child died from languor. Upon opening the body, I found the small intestines red, tumefied, and filled with a large quantity of black blood in clots; the large intestines were healthy. There also existed a very violent pleurisy on the left side. Both the costal and pulmonary pleuræ were covered with a layer of plastic lymph, at least a line and a half in thickness. When this lymph was removed, the pleura beneath was found rugous and very much injected, while the lungs under its coating were found crepitant and perfectly healthy. When the lungs were cut transversely, a well-marked red line could be seen at the circumference of this organ, indicating the separation between the inflamed pleura and the healthy pulmonary tissue. The heart and large vessels were exsanguined; the foetal openings obliterated; the brain, although healthy, contained a small quantity of serum in the ventricles.

From what has been related, we have seen that the emaciation and languor of this child were caused by an obscure pleurisy, the progress of which insensibly led to the death of the patient. In every instance, therefore, in which we see a child languishing, and becoming thin and feeble, we ought carefully to search for the cause of this condition, and endeavor to ascertain whether it does not arise from some obscure organic lesion; we ought not to remain in a security which would leave us tranquil spectators of a disease which perhaps might not have terminated fatally if we had examined with scrupulous attention into its cause, seat, and nature.

As a general rule, it is not easy to make a diagnosis of pleurisy in young infants; still its existence may be suspected when we observe much anxiety, restlessness, difficulty of breathing, painful dilatation of the thorax, quick and more marked contractions of the diaphragm and abdominal muscles; and in the midst of these symptoms, if the cry should preserve its integrity, and present no other alteration than that which arises from fatigue and exhaustion. Percussion and auscultation give but very uncertain signs in this disease; yet if the respiration be not heard at any part of the thorax while the cry is complete and free, and when there would appear as if there existed effusion without hepatization, the infant, in all probability, is affected with pleurisy;

this conclusion will, however, be still uncertain. I must, on this account, consider the diagnosis of pleurisy in sucking children as very difficult, and that it is very easy to confound it with pneumonia. Happily this mistake cannot be very prejudicial to the patient, because the treatment of the one will be the best that can be adopted for the other.

The treatment of pleurisy will differ very little from that of pneumonia; four, six, or eight leeches ought to be applied to the thorax, and the whole of the chest covered with a cataplasm, while a revulsion is made to the arms or legs by means of flying blisters or sinapisms. After sanguineous depletion, dry cups or blisters may be used to the thorax; and if the disease become chronic, it would be useful to clothe the infant, however young it may be, with a flannel waistcoat applied directly to the skin.

Œdema of the lungs.—This disease consists of a serous infiltration more or less abundant in the pulmonary tissue; it is rarely a primary affection, but is more often a sequel of chronic pneumonia or pleurisy; it sometimes is a fatal termination of these diseases. I have several times found the lungs œdematous in the case of œdema or induration of the cellular tissue; they are in a state analogous to that of all other parts of the body.

Whatever be the cause of œdema of the lungs, it gives rise to the most serious symptoms, and especially to a very laborious respiration; yet I have found very often a considerable quantity of serosity in the lungs of infants who have not exhibited any particular symptom of disorder in the chest; it is very probable that this œdema occurs at the moment of dissolution, and must be regarded perhaps as a phenomenon of death. However, it would appear as if this disease may occur without being caused by any antecedent lesion, and give rise to a series of symptoms which have been described with great care by M. Gardien, among which he mentions, particularly, cough, extreme difficulty of respiration, and the imminent danger from suffocation. When the children that I have observed exhibited symptoms analogous to those pointed out by M. Gardien as the effect of œdema, I have several times found the lungs infiltrated with serosity, but there was, at the same time, pneumonia, pleurisy, or bronchitis, so that I could not attribute these symptoms solely to the presence of serosity.

However this may be, I think that if it were possible to distinguish œdema of the lungs from pneumonia or pleurisy in young infants, the application of a blister to the limbs or thorax would answer a better end than sanguineous evacuations. Purgatives, and the oxymel of squills, appear to me to be also indicated.

ART. 5.— Hooping-cough.

I will here record, as concisely as possible, the result of the researches made of the opinions published respecting hooping-cough since its first appearance in Europe. I will endeavor to estimate these opinions according to their just value, and to ascertain what is positive, and draw such practical inferences as will naturally arise in the description of the subject.

This disease is characterized by a suffocating cough, returning in paroxysms, accompanied by an excretion of a very abundant mucus, and always accompanied with a vomiting of mucus, caused doubtless by the irritation of the stomach, the internal membrane of which appears to participate in the catarrhal disease of the bronchiæ. During a fit of coughing, the child experiences all the symptoms naturally arising from immediate suffocation—such as congestion of the face, injection of the conjunctiva, shedding of tears, and a general spasmodic condition excited by the difficulty of respiration. The cough has something hoarse and resounding peculiar to it. I shall not stop to consider the appropriateness of the terms by which the French, Germans, and English designate this disease. They are all indications of the symptoms, rather than the nature of the disease.*

The causes of this catarrhal inflammation, like those of all other epidemics, are difficult to ascertain. The only positive thing that can be said about it is, that it is not really contagious, but an epidemic disease, a distinction which M. Gardien has insisted on with great reason. It prevails often at the same time with ordinary catarrh, sometimes taking its place, or complicating and modifying it, and imparting to it some of its peculiar characters. It has sometimes occurred before an epidemic of

* The word *coqueluche* is, it is said, derived from an old custom of covering the head of the patient with a hood or *capuchon*. The German words *keichhusten* and *stickhusten*, and English expression *hooping-cough*, signify a convulsive cough.

croup, or the latter disease may be developed in the middle of hooping-cough prevailing epidemically; so that the usual causes giving rise to simple catarrh, croup, or hooping-cough, appear to be connected by relations and analogies, the characters of which escape us, it is true, but which allow us to see their simultaneous or consecutive effects. During the time I was at the Hospice des Enfants Trouvés, I saw at the house of a nurse who lived near the "barriere d'Enfer," three children, aged from ten to eighteen months, who were affected in the space of three months with measles, accompanied by a slight anginose affection, simple bronchial catarrh, which soon assumed the characters of hooping-cough, and lastly with croup; all these occurred successively in three children, and cut them off in eight days.

It is difficult for us positively to ascertain the nature of hooping-cough, but we may still obtain some knowledge of its principal characters. Thus it is evident that it is a bronchial catarrh, which can be discovered by the most superficial examination of the symptoms of the patient. This catarrh, however, has something peculiar; the cough which it produces is always suffocating, convulsive, and only occurs in paroxysms. This nervous complication is to be noted, for here its specific character commences, and we can see it, but are unable to explain it without hazarding the danger of wandering into futile hypotheses; yet I will make one remark in relation to this nervous complication; it is, that in adults, as well as in children, affections of the trachea, larynx, and also of the bronchia, often give rise to a sudden local or general spasmodic irritation, characterized by spasm of the affected organ, or by general convulsions. Tonsillitis, simple angina, croup, foreign bodies in the trachea, or tumors compressing the trachea or bronchiæ, produce a cough more or less suffocating, very remarkable for its remissions, and which, in some cases, has a striking resemblance to that of hooping-cough. Admitting, therefore, the specific nature of catarrh in this disease, and that it consists especially in a nervous complication, we are disposed to the opinion that, in many other instances, the diseases of the same organ may exhibit very evidently a nervous complication; whence it will follow, that if in a similar complication consists the specific nature of hooping-cough, the seat of the disease and the physiological lesion which exists be-

tween it and the nervous system, may concur in a manner that will produce the specific quality of the disease in question. The same disease, in different parts of the system, often presents various characters; different diseases having the same seat, sometimes exhibit analogous characters; the seat of the affection then has something that imparts a specific quality to diseases in general, and ought to be considered when treating them.

There is also another circumstance which ought to be considered as peculiar to whooping-cough—that is, the coexistence of mucous vomitings, effected by the cough. This coexistence is easily explained by the relation existing between the mucous membrane of the bronchiæ and that of the stomach, and the frequency of the cough very naturally accounts for the frequency of vomiting.

I do not pretend that I have, by the preceding explanation, satisfactorily accounted for the specific nature of whooping-cough, but have only endeavored to exhibit one of the possible causes of it; and there remains sufficient to call forth all our efforts to unveil the nature of this disease. Some of the most enlightened observers have exercised their talents in the investigation of this subject; such as Rosen, Cullen, Schæfer, Hufeland, Mathaï, John, Authenrieth, Baumes. All have discovered, on examining the bodies of those who have died of this disease, the existence of bronchial catarrh, without any particular lesion of the bronchiæ. This opinion is sustained particularly by Dr. Watt, of Glasgow,* Albers of Bremen, Marcus,† Desruelles,‡ and Ad. Hencke, who in his learned work appears to adopt the same opinion.§

Hufeland thinks that the eighth pair of nerves may have some agency in the production of this disease, and is probably the cause of the double irritation of the bronchiæ and stomach which sometimes appears.¶ This opinion, revised by M. Breschet, who

* *Treatise on the nature and treatment of chin cough, including a variety of cases and dissections*, by Robert Watt, M. D., Glasgow, 1815.

† *Traité de la coqueluche, ou bronchite épidémique, son diagnostic, sa nature, et son traitement*, translated from the German by E. L. Jacques. Paris, 1821.

‡ *Traité de la coqueluche*. Prize essay. Paris, 1827.

§ *Handbuch der Kinderkrankheiten*. Frankfort, 1821.

¶ *System der praktische Heilkunde*. Jena, 1818—1828.

found in two individuals that died of catarrh accompanied with a suffocating cough, the pneumo-gastric nerves red externally and yellow internally, has not been confirmed by the indefatigable researches of M. Guersent; and I have, in every instance of death from whooping-cough, dissected the pneumo-gastric nerve, without ever being able to discover any lesion; so that this idea must be considered as not yet demonstrated.

Lastly, Authenrieth, from the success which followed his method of treatment, is of opinion that whooping-cough is owing to an accumulation of lymph towards the bronchiæ, and that this cause can be removed by causing exteriorly the formation of pustules which contain lymph.*

The examination of bodies has not exhibited any thing uniform in this disease, except bronchial catarrh in various stages of advancement, almost always accompanied with a considerable quantity of mucosity accumulated in the bronchiæ, which are sometimes sensibly dilated, and exhibit a vivid red color. Among the concomitant lesions of the catarrh, there are very often found inflammation of the lymphatic ganglia in the vicinity of the bronchiæ, and a dilatation of the termination of the bronchiæ, pointed out for the first time by Laennec. I once saw this in a child of fifteen months, and who presented at the extremities of the bronchiæ a species of small vesicles filled with a creamy, inodorous pus. The unequal dilatation of the bronchiæ has also been met with in some infants; it is the same in emphysema; lastly, this disease is found complicated with pneumonia, pleurisy, pulmonary tubercles, chronic enteritis, mesenteritis, meningitis, hydrocephalus; but in considering the variety and number of these complications, do we not see also that some are the ordinary result of pulmonary affections of long duration, and other accidental effects of peculiar idiosyncrasy? Wherefore, then, seek among all the complications of whooping-cough for lesions, which will give us a proper idea of the seat and nature of the disease, whilst there exists one principal lesion always constant, always identical, to which it is more natural to refer the prerogative of being one of the principal causes of whooping-cough? I am sensible how much the nature of the discussion upon which we have

* *Versuche für die praktische heilkunde.* Tubingue, 1808.

entered is calculated to lead us into vain speculations; I will hasten then to trace the progress of the symptoms and the treatment of this disease.

All authors since the time of Rosen have recognised different periods in the disease, and M. Guersent, in his excellent article *Coqueluche*, in the *Dictionnaire de médecine*, has traced them with great care. The development of this disease doubtless exhibits several stages, but notwithstanding the attention I have bestowed on the subject, I have found them so variable with respect to their duration, and even their characters, that I believe it to be impossible to assign to them any constant symptoms or limits.

Hooping-cough always commences with simple bronchial catarrh; and even during its prevalence as an epidemic, many children have nothing more than a catarrh, which terminates at the end of a few days or weeks without ever exhibiting the characters of hooping-cough, whilst other children living under the same atmospheric influence have the disease with all its peculiar traits. Is it that some have a *false* and others a *true* hooping-cough? It would be scarcely in place to repeat what has been said of croup with regard to this question. It is much more reasonable to believe that the disease has existed in these children in different degrees, and that it varies in them from a slight to a severe affection. When the cough increases, with the irritation of the bronchiæ, the face becomes puffed, the eyes injected, the respiration accelerated; the expectoration is at first thin, limpid, and serous; the cry and voice become peculiar in their tone, easily recognised by experienced practitioners. I have often seen children with the disease confined to simple bronchial catarrh, and continue for a long time only affected with it in this simple form. I remember particularly a little girl at the infirmary of the Hospice des Enfants Trouvés, who had a peculiar cough, accompanied with symptoms of suffocation and an abundant expectoration, which lasted about forty-eight hours. It was thought that the hooping-cough was about to be developed, to continue for a greater or less time; nothing of this kind, however, occurred, and the symptoms disappeared rapidly without any active treatment; and although this child remained

some time in the infirmary, there existed no more symptoms of suffocating catarrh.

When whooping-cough becomes severe, the chest, particularly about the sternum, is the seat of considerable pain; the cough returns in paroxysms, with shorter intervals between them, increasing more at night, and is almost always preceded by a mucous r le, which is more evident as the paroxysms approach each other. In a fit of coughing, the suffocation, pain, and strangling produce the greatest distress in the patient, who seizes every thing within its reach with a spasmodic effort, with violent attempts at inspiration, accompanied with acute cries and smothered and incomplete wheezings; in the meanwhile, the face becomes purple and tumefied, the jugular veins are filled with blood, the neck dilates with a painful effort, and the limbs are stiffened with spasm; the child, alarmed at its own distress, sometimes loses its consciousness, and appears, from the momentary suspension of breathing, to be dying. Very frequently there is no r le heard during the paroxysms of coughing, and it is remarkable that the more dry the cough the more painful and suffocating it is; it becomes much less when the mucosities are abundant in the trachea. All these violent efforts usually terminate in vomiting, by which the child not only throws up what it had eaten, but likewise an abundance of mucosity. When the cough ceases, the child recovers from its distress by degrees, remains exhausted for some minutes, and complains, if old enough, of pain in the forehead and sternum; its cry and voice are feeble; but this state of fatigue is of short duration, for its gaiety soon returns, and it enjoys the sports of its age until prostrated by a new paroxysm of coughing.

Whooping-cough continues for a greater or less time in the acute state, such as I have just described; it is often accompanied with fever, especially in the commencement, but by degrees this symptom of reaction becomes less intense, or does not appear at all. This is not the case, however, when it is complicated with pneumonia, pleurisy, or hydrocephalus. When whooping-cough occurs in scrofulous children, it may hasten the disorganization which tubercles effect, and thus terminate in phthisis of the larynx or lungs.

At the end of a few weeks or months, the symptoms diminish

in intensity, the expectoration is more abundant, and the mucosity thicker; the cough becomes less fatiguing, is less intense and less frequent, and finally disappears with the whole assemblage of other symptoms.

The prognosis of whooping-cough is unfavorable in proportion to the dangerous nature of its complications and the early age of the child. M. Guersent has correctly observed that in infants at the breast it is often complicated with cerebral congestions, and from the first development of this disease in them, this complication is quickly fatal. We can easily conceive the danger arising from pneumonia, pleurisy, softening of tubercles, pneumo-thorax, and other complications of whooping-cough.

Treatment.—Two principal indications present themselves in the treatment of this disease—to combat the inflammation of the bronchiæ, and to moderate or remove the nervous complication. It will be necessary, in the beginning of the disease, to have recourse to sanguineous evacuations, both general and local, to demulcent drinks, and revulsives to the intestinal tube; in a word, it must be treated by a purely antiphlogistic method, rigorously pursued during its inflammatory stage: as bronchial irritations will quickly produce in young infants pulmonary or cerebral congestions, it will be useful to apply a few leeches to the neck or lateral parts of the thorax, upon the slightest symptoms being perceived of irritation in these organs. This was the practice, observes Dr. Dewees, of Willis, and appears to have been the general practice of the age, and particularly of Sydenham, Astruc, Home, and others. The success of these celebrated practitioners ought to induce us to imitate their practice. I cannot believe it to be a natural practice to administer emetics at the same time, in order to relieve the stomach from the mucosity with which it is filled. If antimony and squills are to be given, it ought rather to be as expectorants than in vomiting doses; as half a grain of kermes, (sulphuret of antimony,) in a two-ounce mixture, for a child of eight months to a year old, is sufficient to produce an abundant expectoration. We should remember that very young infants do not expectorate, and that it will but fatigue them in vain to persevere in giving medicine of this kind. The English physicians assert that calomel, given in doses of a few grains every two or three days, renders the progress of whooping-

cough more irregular and shorter. I can conceive, indeed, without partaking of their predilection for this medicine, that it will accomplish a good purpose in keeping the bowels open, and thus advantageously counteract the catarrhal inflammation of the bronchiæ.

When we are satisfied that the first symptoms of inflammation are moderated, and that the nervous irritation of the bronchiæ is the cause of the existing symptoms, we should endeavor to remove it, and not remain inactive, which may be fatal to the patient, under the belief that the whooping-cough must run through its course; for it is not more dangerous to arrest the progress of this disease than to stop an intermittent fever, the progress of the one requiring as much attention as that of the other.

We ought, therefore, to avail ourselves of narcotic and antispasmodic remedies at the period of the disease—as a demulcent mixture, with a quarter or half a grain of the extract of opium, or, what is still better, one or two drachms of syrup of poppies. Asafoetida, given in injection, has succeeded in the hands of some practitioners, but its efficacy is not as yet sufficiently demonstrated. Cullen, observing the periodical return of the cough, employed cinchona, but his example has not been followed by others. Some advantage might be obtained from the use of sulphate of quinine in small doses; yet it must be observed that the remission is very irregular, and consequently we cannot foresee its return, and might give it even at the moment the cough commences, which, without doubt, would interfere with the efficacy of the remedy. Hyoscyamus, belladonna, and cicuta have not been forgotten among the narcotics used for the treatment of whooping-cough. The powder of belladonna, or its gummy extract, in doses of a quarter to half a grain in any vehicle, will produce good effects, but its operations are very uncertain. The sedative used by M. Guersent with great advantage, is a mixture of equal parts of oxyde of zinc, belladonna, and cicuta, commencing with a quarter of a grain of these substances, given three times a day, and increasing it according to the effect experienced from its use. He has also used the oxyde of zinc with success in the dose of a grain every hour in an infant of six weeks, where he had in vain attempted to arrest the paroxysms of coughing.*

* Guersent, article *Coqueluche*, in the *Dict. de méd.*, t. vi. p. 20.

We should also use counter irritants to the skin, when the disease exhibits no more sign of active inflammation. Blisters between the shoulders, camphorated and ammoniated frictions on the arms or lateral parts of the chest, may perhaps be of some utility. Without endeavoring to accomplish the end for which Authenrieth has advised frictions with his ointment, we may nevertheless use it as a simple revulsive; the epigastrium or thorax may be rubbed with an ointment composed of one part and a half of tartar emetic to eight parts of the lard; care must be taken not to rub the pustules already formed, for ulcers may arise and cause fever. Dr. Dewees uses an ointment composed of the same, with the addition of fifteen drops of ol. lavend. or lemon.

The state of feebleness in which the child remains for a long time after the whooping-cough has disappeared, requires the greatest attention from the physician. Before using tonics, such as the syrup or wine of cinchona, it will be necessary to habituate it gradually to nourishment of increased strength, as chicken water, veal or beef tea, animal jellies, feculent vegetables, and only habituate it progressively to the use of medicinal or other wines. Goats' milk, pure or diluted, a good nurse, a residence in the country, particularly in the spring and summer, will materially conduce to the recovery of infants at the breast.

This is perhaps the proper place to speak of nervous respiration—such as hiccup, spasm of the glottis, etc.; but as we are in possession of no other than very uncertain data upon these affections, I do not think it necessary to devote a chapter to the consideration of a subject on which I have nothing more to say than has already been advanced a number of times. It is, besides, to be remarked, that spasm of the glottis is often but a symptom of different inflammatory diseases of which I have already spoken.

I will end this account of the history of diseases of the thorax by observing that the application of the stethoscope and percussion are neither so useless in infantile diseases or so injurious to them as M. Denis has asserted in his work, (page 336,) or as is expressed by M. Guersent in the article *Enfant* in the *Dict. de méd.* We have seen in this chapter that these means may be used as a proper method of investigation in the thoracic diseases of children.

CHAPTER IX.

DISEASES OF THE CIRCULATORY APPARATUS.

Development and congenital malformation.—The heart does not appear until some large vessels are already formed, and the vena porta usually exists before it. At the commencement it appears to be but a swelling of this vein; this swelling soon becomes curved in a semicircle, presenting three dilatations and two contractions; these dilatations are the auricles, left ventricle, and the commencement of the aorta; they gradually disappear by the approximation of the cavities. Such, at least, are the first appearances of the heart and vessels observed in the chick by Haller, and in the heart of the human foetus by other experimenters. In proportion as the heart is developed, the various parts composing it assume, by degrees, the form and dimensions which they naturally have. Sabatier and Wolff have seen, however, the septum which separates the two auricles form, by degrees, but having at the period of birth an opening by which the blood passes from the right to the left cavities; and it appears that the septum which divides the two ventricles is formed by a kind of prolongation which rises from the base of the left ventricle, and is continued towards the summit. M. Meckel has made some very interesting observations on the respective dimensions of the cavities of the heart during its formation. At first the left ventricle is the largest; afterwards the same size as the right; and then the latter, in its turn, becomes the most voluminous. The auricles surpass the ventricles in size when the embryo is quite young, but at the time of birth it is reversed.

The aorta exists singly at the seventh week; but it soon exhibits two divisions, the one of which is the pulmonary artery. The latter, at the fourth and fifth month, has branches which go to the lungs, and which are not so voluminous as the arterial duct. All these parts of the circulatory apparatus are developed

successively, and acquire the dimensions, divisions, and relations which each of these vessels have during the remainder of life.*

While the heart is thus passing through its various stages of formation, it may undergo some arrest of its development, which will produce, at the period of birth, and for a long time after, the most serious symptoms. I will not stop to describe all the malformations which the heart can undergo, for they are of infinite number. The most of them, besides, are only developed in proportion as the child advances in age, or are the persistence of the particular disposition of the heart in new-born children; so that they give rise to no symptom during first infancy, and only manifest their existence by external signs at a more advanced period of life, and do not constitute one of the diseases of infancy. I will, therefore, confine myself to pointing out some of the principal malformations of the heart.

An entire absence of the heart is only found in acephalous children. It is a rare thing to see a single heart: that is to say, destitute of one of its lateral portions, and consequently presenting only one ventricle and one cavity. I will here record an instance of this kind, the more interesting as the description of this monstrosity is accompanied with an account of the symptoms presented by the child during life. This case was communicated to the *Journal of Medical Sciences*, of Philadelphia, by Dr. Mauran, a physician residing at Providence.

CASE LXXVI.—On the 19th of March, 1827, I was requested, through the parent, Mr. A. B., to examine, post mortem, the case of his child, who had died under peculiar and inexplicable circumstances, the history of which was as follows: The labor was natural; the child, though small, appeared well and healthy; the respiratory apparatus responded readily to its natural stimulus, and thus continued while the child remained in a quiescent state, but from the change of position in washing, dressing, etc., it was noticed to be particularly affected. The child experienced the greatest difficulty on crying and respiring. These symptoms occurred occasionally on motion, but were counteracted by restoring the child to a quiescent state. Ten days after birth I was called to revisit the patient, who was laboring under a supposed inflammation of the lungs, attended with a difficult and apparently painful respiration; there was a light fever and slight

* Ph. Béclard, *Embryologie*, p. 84.

cough. I learned from the nurse that the paroxysms would recur at irregular intervals, commencing with a convulsive or spasmodic action of the whole chest. Respiration was interrupted, and would continue for many minutes, when the patient would apparently cease to breathe, the whole surface to the extremities putting on the above described livid or purple hue—in fact, exhibiting the perfect “*puer cæruleus*.”

By inclining the child forward on the nurse's lap, thereby affording a pressure upon the chest and abdomen, a slow return of the functions of respiration was noticed; the livid hue at the same time yielding to the improved circulation, its ordinary healthy aspect was gradually restored to the surface. The *primæ viæ* were directed to be moderately evacuated, slight pectorals, with antispasmodics, prescribed, and perfect rest enjoined. Notwithstanding these means, it died in one of the paroxysms we have mentioned.

The dissection, fifteen hours after death, discovered the following interesting appearances. The child was small, and exceedingly emaciated; surface yet livid; abdominal viscera perfect. On introducing a blow-pipe into the vena cava ascendens, we could inflate the whole viscus (auricle, ventricle, and coronary arteries). The heart being divided through the ventricle, vertically from its apex to the origin of the aorta, the following *unique* appearances were discovered. It was in fact a *single heart!* having but *one auricle* and *one ventricle*, communicating by a large free foramen, the borders of which gave origin to a tricuspid valve. The pulmonary artery exhibited the most interesting feature of the general malformation; arising almost in immediate connection with the aorta on its left side, from one common ventricle, it passed backwards, giving out its accustomed branches, and thence becoming ductus arteriosus, was found pervious and opening into aorta descendens. From the fact of the previous state of this duct at its aortal termination, a more minute investigation was instituted, which exhibited it perfectly impervious at its origin, from the ventricle between which and the bifurcation was a perfect cul-de-sac. The auricle was next observed attached to the ventricles extensively and on its left side; its size, when dilated, being more than two thirds that of the ventricle, and exhibiting, anteriorly, two auricular appendages. A vertical section of the ventricle exhibited the parietes unusually thick and strong, being largely studded with the columnæ carneæ.*

* *Account of a malformation of the human heart:* by J. Mauran, M. D., of Providence, R. I. (Philad. Journ. Med. Sciences, No. 10.)

It is evident that in this child the blood could not become oxygenated in sufficient quantity to preserve life; yet nature appears to have made the following provisions to supply the absence of one of the cavities of the heart, as Dr. Mauran remarks: the blood having arrived at the ventricle, was propelled towards the aorta, but, instead of coming to the lungs through the pulmonary artery, which was obliterated near the heart, the lesser circulation was affected indirectly by a retrograde current through the ductus arteriosus, thence into the pulmonary branches, to be returned to the ventricle, the common receptacle of this and of the black blood of the cavæ.

Instead of meeting with so complete an absence of one of the lateral parts of the heart, there is sometimes only a deep depression between the two ventricles, one of which, much smaller than the other, appears to have been arrested in its development. The plurality of the heart, according to Meckel, is extremely rare in cases where there is not a duplicate fœtus. The development of the auricles is considerable in some infants. I once saw, in a little girl that died some days after birth, a pointed prolongation of the right auricle, of about an inch long; it hung loose in the pericardium in front of the heart. The excessive size of the heart may perhaps be owing to a malformation.

Narrowness of the auriculo-ventricular or vascular orifices, is scarcely observed at the period of birth; but in proportion as the child advances in age, if the size of the orifices do not follow the progress of the cardiac development, there is then a greater or less disturbance in the functions of the circulatory apparatus; producing several disorders, designated by authors under the general term of asthma. Lastly, we must mention, also, among the congenital malformations of the heart, the irregular insertion of the large vessels, the transposition of the organ to the right side of the chest, a deviation of more frequent occurrence than is generally believed, and of which M. Baron has presented several instances to the Academie Royale de Médecine. Besides these, there are several organic aberrations of the principal organs of circulation in an infant at birth—too many for enumeration here. The symptoms of the greater part of these organic deviations which have been mentioned occurring at birth, are, defect of hæmotosis, suffocation, irregular pulsations of the heart,

cerebral and pulmonary congestions, and, very frequently, death.

Soon after birth, the circulatory apparatus undergoes alterations of the greatest importance, not only in its organization, but also in its functions; and it is to these changes that the many affections peculiar to infants are to be attributed; but in order to understand precisely the modifications of the circulatory apparatus may be a cause of the many morbid symptoms in young infants, it appears to me necessary to follow with care the progress of the organic and functional changes, in order to appreciate properly the influence they may exert upon the health of the child. I will therefore divide this chapter into two articles: the one treating of the establishment of the circulation, the other of the diseases of the circulatory apparatus.

ART. I.—Of the establishment of independent circulation.

I have studied with the greatest care the changes which occur in the heart, ductus arteriosus, ductus venosus, and umbilical arteries, during the first days of extra-uterine life, and shall exhibit here the results of these researches.

I shall consider successively—1st, The period at which the fœtal openings are obliterated; 2dly, Their mode of obliteration; 3dly, I will exhibit the physiological and pathological consequences which naturally flow from these researches.

§ I. PERIOD OF THE OBLITERATION OF THE FŒTAL OPENINGS.—*Infants of the age of one day.*—In nineteen children aged one day, there were fourteen in whom the foramen ovale was completely open; in two of them it had begun to be obliterated; and in two it was entirely closed. Consequently no blood passed through it.

In the same children, the ductus arteriosus was free and filled with blood in thirteen; its obliteration had commenced in four; and in the remainder it was completely obliterated. I also noticed that in one of the last mentioned children there was a complete occlusion of the foramen ovale. In the other children in the same state, the ductus arteriosus was still open.

With respect to the umbilical arteries, they were still open near their junction with the iliac arteries, but their calibre was narrowed in consequence of a very remarkable thickening in their

walls. In all these children, the umbilical vein and ductus venosus were free, and the latter was most generally gorged with blood.

From this examination it appears that the foramen ovale and ductus arteriosus are still open on the first day of birth in most instances, although they may be obliterated at this period.

Infants of the age of two days.—In twenty-two children, aged two days, there were fifteen where the foramen ovale was perfectly open; in three of them it was almost obliterated; and in four entirely closed. In thirteen of these children I found the ductus arteriosus still open; in six the obliteration had commenced; and in three was entirely obliterated. In all, the umbilical arteries were obliterated to a greater or less extent, but the umbilical vein and ductus venosus, although empty and flattened, would not allow of the passage of a moderate sized stylet. These facts are sufficient to demonstrate that, in most instances, the foramen ovale and ductus arteriosus are not obliterated on the second day after birth, although the child may enjoy independent life; as to the umbilical arteries, having now become useless, they undergo the changes resulting from their default of action.

Infants of the age of three days.—I also subjected the bodies of twenty-two children aged three days to the same examination. In fourteen of these the foramen ovale was still open; in five, the obliteration had already commenced, and was complete in the remaining three.

The ductus arteriosus was also open in fifteen; the obliteration had commenced in five, and was complete in two. Both of these subjects also presented the closure of the foramen ovale. The umbilical vessels and the ductus venosus were empty and obliterated in all these subjects. Now it is evident that these vessels are obliterated before the foramen ovale and ductus arteriosus have undergone any complete occlusion, and it can therefore be asserted, that at the third day the ductus arteriosus and foramen ovale are not generally closed.

Infants of the age of four days.—I found in twenty-seven children, aged four days, the foramen ovale open in seventeen. In these seventeen cases, there were six where this opening was very large, and distended with a considerable quantity of blood; and in the remaining number it was slightly open. In the

twenty-seven cases now under consideration, the closure of this opening had commenced in eight, and it was completely closed in two.

The ductus arteriosus was still open in seventeen children; its obliteration had begun, and it exhibited nothing more than a small hole in seven of these, and its closure was complete in three; the umbilical arteries in almost all were obliterated near the umbilicus, but still susceptible of dilatation near the junction with the iliac arteries. The umbilical vein and the venous canal were completely empty, and considerably contracted.

Infants of the age of five days.—Twenty-nine children, aged five days, were subjected to the same examination as in the preceding instance; thirteen exhibited the foramen ovale still open; but this opening did not exist in the same degree in all. It was largely dilated in four individuals, and in ten others its diameter was much smaller.

This passage was almost completely obliterated in ten individuals, and in six others sufficiently so, as to leave no communication between the auricles.

I found, in these twenty-nine cases, the ductus arteriosus open in fifteen; in these fifteen there were ten where the duct was very large. The obliteration had made considerable progress in the remaining five; and was almost complete, or at least the calibre of the duct consisted of nothing more than a narrow hole, in seven; and in seven others the obliteration was complete. As to the umbilical vessels, their obliteration was complete in all.

We have seen, thus far, that the fœtal openings remained free in a number of children five days after their birth. None of the children exhibited any peculiar symptoms which appeared to have their seat in the circulatory apparatus. We shall find the number diminish in subjects of more advanced age than those which have already been the object of our researches.

Infants of the age of eight days.—I have not observed any well-marked difference between children of six or seven days, and those which we have just described. This remark, however, is not applicable to those of eight days. Indeed, I have found but five where the foramen ovale was still open in twenty cases that I examined. It was partially closed in four individuals, and its occlusion was complete in eleven.

In these twenty children there were but three in whom the ductus arteriosus was not yet obliterated; one of them presented an aneurism of the duct, of the size of a hazelnut; interiorly it was covered with a thick layer of a yellow color and fibrinous consistence, analogous in every respect to those fibrous layers which cover the interior of an aneurismal pouch.

In these twenty individuals, I found in six the ductus arteriosus almost entirely obliterated, and its obliteration was complete in eleven. The umbilical vessels were perfectly closed in almost all; I say in almost all, because I observed neither the umbilical arteries nor vein in five of them.

From the last examination, it appears that the foetal openings are usually obliterated on the eighth day, but they may yet be found open even at that period; I will also add that even on the twelfth and fifteenth day, and in the third week, the foramen ovale or ductus arteriosus may still be open without the child experiencing any particular symptom; for I will again observe that I have chosen for these researches children who for the most part died from affections in which the respiratory apparatus did not participate.

From this exposition, it is evident that the foetal openings are not obliterated immediately after birth; that the period at which this occurs is extremely variable, yet the foramen ovale and ductus arteriosus are usually closed on the eighth or tenth day. It results also from the examination which we have made, that the modifications which follow the cessation of foetal life, in the circulatory organs of a new-born child, occur in the following order: the umbilical arteries are first obliterated, then the vein, next the ductus arteriosus, and lastly the foramen ovale. The pre-existence then of the foetal openings for some days after birth ought not to be considered as a disease, since it is not uncommon to meet with it without having given rise to any particular symptom. This irregularity or tardiness is attributable, as will be presently seen, to the mode of obliteration.

§ II. MODE OF OBLITERATION OF THE FOETAL OPENINGS.—

When the arrangement which gradually occurs in the foramen ovale from the earliest months of conception until the period of birth is examined, it will be perceived that the form of this opening and the disposition of the surrounding parts, and particu-

larly that of the Eustachian valve, are such that the blood, which at first flows without any obstacle from one auricle to the other, by degrees experiences some difficulty in its passage. Sabatier especially has remarked this. Thus the first modification in the organization of the heart forces the blood to change its course; this fluid, in itself inert, is under the immediate dependence of the moving power which projects and directs it through the proper passage. If this be so, it must also follow that in those parts which the blood leaves, an anatomical modification occurs, which changes the form and modifies the action of these organs, and produces, in the blood which flows through them, a change of direction. Now if the umbilical arteries and the arterial duct are examined, in proportion as they become obliterated, it will be seen that their walls gradually become thickened. The thickening of the umbilical arteries is more remarkable at the point of insertion at the umbilicus, at which part they exhibit a kind of swelling which very materially affects the calibre of the artery, and this swelling appears to be the result of a species of hypertrophy of the yellow elastic fibrous tissue; whence it follows that the artery exercises at this part a contractile force superior to the dilating power of the blood propelled by the iliac arteries. It is very easy to prove the thickness of the walls of the artery by cutting it in sections at this part; the thickness, it will be also perceived, diminishes in proportion as we approach the iliac arteries, and it is precisely in this direction that the progress of the obliteration is observed to occur after birth. Two conditions, therefore, cause the blood after birth to leave the course it had while in the uterus: 1st, the establishment of respiration and the pulmonary circulation; 2dly, the modification of texture occurring in the umbilical arteries.

The following phenomenon proves also that the contractility of the umbilical vessels is susceptible of suspending the course of the blood in them; if the umbilical cord be cut at some distance from the umbilicus at the time of birth in a plethoric child, the blood will at first be seen to issue in a jet with considerable force, then becoming slower, and afterwards stopping altogether; if another portion of the cord be cut another jet of blood occurs, and soon stops. This hemorrhage may be renewed at each section of the cord. M. P. Dubois has informed me that he has

seen this frequently occur. Now the course of the blood is in some degree arrested, because the umbilical arteries contract on it and force it to retrograde; if there exist near the umbilicus and within the abdomen a portion of the umbilical arteries more contractile from the existence of a greater quantity of elastic fibrous tissue, it can easily be conceived that the course of the blood in the child becoming less quick when the calm which occurs after birth begins to be established, these arteries may have power to resist from the first the progress of the blood; in proportion as the child advances in age, the artery becomes more obliterated, and undergoing a kind of traction from the progressive widening of the abdominal parietes, it loses altogether its vascular form, and is transformed into a true ligament.

What is observed in these arteries occurs also in the ductus arteriosus. In the embryo it is as flexible as the other arteries, and is, therefore, as easily dilated by the column of blood which flows through it, which penetrates without any obstacle into the aorta; but at birth, and after this period, the walls of this duct become gradually thicker, and a sort of concentric hypertrophy is developed in them, which, without diminishing in appearance the size of the vessels, nevertheless produces a contraction of its calibre, by which the blood driven from this duct passes through the pulmonary arteries. When the ductus arteriosus has undergone this hypertrophy and obliteration, I cannot describe it better than by comparing it to a tube, the circumference of which is very thick, and that presents in its centre nothing more than a small hole.*

The obliteration of the vein and duct does not occur in the same manner. These vessels do not exhibit, as do the others, any remarkable thickening of their walls; the moment the umbilical cord is cut, the vein is no longer susceptible of receiving blood in its calibre, at least except by regurgitation from the vena cava. The sides collapse and approach each other; they thus come in

* These observations are confirmed by those made previously by Dr. Berndt, of Vienna, professor of legal medicine, relative to the changes which the ductus arteriosus undergoes after birth,—changes on which the German professor has founded his most conclusive proofs of the persistence of life after the birth of the child. The history of the closure of the foetal vessels has been also considered by Careano, Trew, etc. V. the article of Dr. Robert Arrowsmith on this subject, in the *Journ. Hebdom. de méd.*, t. iii., 1829.

contact, and the passage is at last obliterated, as is seen in all tubes of every character as soon as they no longer give passage to the fluid usually passing through them. Yet they still preserve for a long time a free passage, for they may easily be distended by introducing into them an ordinary sized stylet, while this is not the case with the arteries. In the arteries there is, if I may be allowed the expression, an *active* obliteration; the blood has been forced to abandon them by a succession of organic modifications occurring in the texture of their walls, while in regard to the umbilical vein and venous duct, there is a *passive* obliteration—that is to say, it follows the absence of the blood; it is the result and not the cause of the retro-pulsion of the sanguineous fluid. This difference doubtless depends on the difference of organization between the arterial and venous system. If it be necessary that the foramen ovale and ductus arteriosus should undergo organic changes for their obliteration, it will be easily understood that nature, so fertile in anomalies, may prepare these modifications either prematurely or tardily; hence the cause of the obliteration of the fœtal openings from the first in some children, and the persistence of the foramen ovale and ductus arteriosus in others, to a period far removed from birth. Hence also the necessity of a greater or less time in most cases for the completion of this obliteration. In this manner can be explained the irregularities of the period of the complete establishment of the independent circulation, without the necessity of considering them as the cause or effect of certain diseases of the heart or lungs.

The accomplishment of these phenomena of transition must doubtless be attended with an incomplete oxygenation of blood, since all this fluid which the heart propels to the different parts of the body has not passed through the lungs. But after all, is it necessary that the blood of an infant just born should be oxygenated, equally with that which passes through the arteries of an adult? Would it not rather appear that the tender frame of a new-born child ought not to receive blood possessing too much stimulating properties, that the materials of nutrition should not be too suddenly charged with exciting principles, the action of which on the organs of an infant may be injurious to its health, and to the progressive establishment of independent life? I am

of this opinion, and do not think its correctness can be denied, flowing as it does from the anatomical examination of the circulatory organs of a young child. This assertion is supported by another remark,—the lungs would be exposed to fatal congestions if the pulmonary arteries should suddenly throw into them all the blood which flows into the heart. The ductus arteriosus, by permitting the blood to pass through it, comes, as it were, to the aid of the respiratory organs, the congested state of which will not permit the air to arrive freely in the cells; the establishment of independent life is, therefore, acutally promoted by the continuance of fœtal life. Thus, then, there is a connection between the organization and disposition of parts, and the exercise of their functions, and they follow in a regular order, and by transitions prepared by nature, to the end that no sudden and unexpected change may interrupt the order and harmony of the phenomena of life. If these openings continue beyond the period we have indicated, they may be followed by diseases which we shall consider in the following article.

ART. 2.

§ I. DISEASES OF THE HEART AND LARGE VESSELS.

Diseases of the heart in young infants, as in adults, consist for the most part in organic lesions, existing at birth, but the effects of which are not manifested until a more advanced age. The history of diseases of the heart does not then belong exclusively to the pathology of children at the breast. I shall therefore confine myself to the consideration of those affections of the centre of circulation which are the most frequently met with in young infants.

The persistance of the inter-auricular orifice and ductus arteriosus does not produce, as we have just seen, any particular symptoms during the first days of life, provided it does not oppose the perfect oxygenation of the blood. But if, at the same time, there exist a considerable sanguineous plethora, this malformation, joined to the impossibility or extreme difficulty of the establishment of respiration, hinders the oxygenation of the blood, producing the disease known by the name of cyanosis.

Cyanosis—cyanopathia, as M. Marc proposes to denominate

it,—is a disease which may be observed at all ages, and upon the nature of which Corvisart, M. Gintrac, and M. Marc have published some interesting reflections, is not the constant result of the persistence of the foramen ovale, nor of the passage of venous blood into the arterial system, since there are a number of examples of malformation of the circulatory apparatus existing which might have produced this phenomenon without its ever having appeared. But this blue coloring of the integuments is probably owing to the mixture of the two kinds of blood, or to a defect in the oxygenation of the arterial blood, either on account of the existence of a communication between the two lateral cavities, or of its incomplete oxygenation in the lungs. Thus it is not surprising to find in an infant born in a state of threatened asphyxia, and in whose lungs the air has not penetrated, a sort of transient cyanopathia, which disappears immediately upon the complete establishment of respiration. Corvisart has very happily described the resemblance between the coloring of a newborn child with incomplete respiration, and that of an adult whose heart exhibits malformations or organic lesions, which embarrass or suspend the normal course of the blood. "In comparing," says this illustrious physician, "the effects produced by the communication established between the right and left cavities of the heart with those immediately resulting from various species of asphyxia, do they not exhibit a striking analogy? Is there not something equally remarkable between this state and that which is seen in some children after birth, especially after a more or less tedious labor? The face has more or less a blue-violet color, and even the body presents the same tint sometimes to a high degree; in all, the body is cold to the touch."

In considering the apparently contradictory facts published on the subject of cyanosis, by Duret, Corvisart, M. Marc, M. Breschet, M. Fouquier, etc., I think it in our power to draw a conclusion of a middle character between that opinion which regards the affection as the result of a malformation of the heart and the opposite; it is, that cyanosis being to all appearance the effect of a want of oxygenation of the venous blood, it may exist with or without a malformation of the heart, provided the blood, in passing through the lungs, does not undergo the vital and chemical modifications which naturally occurs in them. If, notwithstand-

ing the communication between the auricles, cyanosis does not take place, it is because the blood passing through the lungs is in sufficient quantity, and sufficiently oxygenated to impart its oxygenation to the venous blood with which it is mixed. On the other hand, if the cavities of the heart are in a normal state, but the peculiar disposition of the lungs does not permit the oxygen of the air to transform the venous into arterial blood, cyanosis will be the result. Whence it follows that this disease is always an indication of a defect in the oxygenation of the blood, whether there exist a malformation of the heart or not. Do we not see in infants in whom the pulmonary circulation is intercepted by an engorgement or an inflammation of the lungs, the alæ of the nose, the lips, the face, and even the extremities become bluish—the first degree of cyanosis? And while children affected with pneumonia are *in articulo mortis*, is it not very common to see every part of the body become livid and blue? The cause of cyanosis may, therefore, consist in a malformation of the heart, complicated with congestion or inflammation of the lungs, or in an affection of the lungs without organic lesion of the heart; and in every instance where it exists, if the functions of the lungs are performed freely, cyanosis, it is evident, cannot occur, because the venous blood receives, by its mixture with the arterial, a portion of its chemical and vital properties, which it needed.

This explanation is applicable to a great number of cases, but it is necessarily liable to many exceptions; it cannot, for instance, explain the remarkable fact pointed out by M. Breschet, who saw, in a child about a month old, the left subclavian artery arise from the pulmonary artery, without causing the slightest change of color in the left arm, which received no other than venous blood.*

Local or general cyanosis, however, in most instances, in newborn children, is the effect of a sanguineous congestion about the heart or lungs, and the best method of relieving it is that recommended by Corvisart, to hold the child near the fire, and to rub gently the head and body with hot cloths. This should be perseveringly continued, and is much better than all the aspersions

* Ferrus, art. *Cyanose*, *Dict. de méd.*, in 21 vol.

recommended by accoucheurs.* When it is the effect of pneumonia, the proper means for treating this inflammation must be adopted, of which it is only a symptom.

It is rare to see in children at the breast the different kinds of aneurism which are so frequently met with in more advanced age. In general, the right cavities of the heart exhibit at birth the difference of capacity which they have with reference to the left cavities during life; this at least is true with respect to most of the infants which I have dissected. Yet I have often seen two ventricles of the same width and same thickness of the walls; but this is much more rare than the preceding.

I have seen but one case of passive dilatation of the cavities of the heart in an infant at the breast. This case appeared to me the more interesting, as the child exhibited symptoms analogous to those which are observed in adults similarly affected.

CASE LXXVII.—*Passive aneurism of the heart.*—Marie Lhéritier, aged two days, of a good constitution, entered the infirmary on the 1st of September. It was observed that this child was frequently attacked with syncope, prolonged to so great a length of time as to produce a belief sometimes that she was dead. The pulsations of the heart were usually obscure, slow, and irregular; the cry was strong and complete, the percussion of the thorax very sonorous, and respiration could be heard in every part. As there was no other symptom present, she was placed under the care of the ordinary nurses, in whose charge she remained until the end of October. The symptoms of which I have spoken became more frequent, and she re-entered the infirmary, presenting a considerable emaciation; respiration was extremely difficult, labored, and occasionally suffocating; there was a bluish coloring about the alæ of the nose and lips, and the syncope occurred two or three times a day. The pulse was small and irregular; extremities cold and œdematous; cry distressing, and as if dying. Death occurred on the 2d of November, while vomiting brown and bloody matters.

On opening the body, there was found a general discoloration of the mucous membrane of the intestines, on the surface of which there was exhaled some black fluid blood. Some tumefied follicular plexuses existed in the ileo-cæcal region.

The posterior border and the inferior lobe of the right lung were

* Corvisart, *loc. cit.*

hepatized; the ductus arteriosus was obliterated; the heart was about the size of a hen's egg; the ventricle and the auricle of the right side formed, as it were, the volume of the organ. Their cavities were very much dilated, and their walls almost as thin as a sheet of paper, whilst the opposite cavities were very much contracted, and their walls hypertrophied; the inter-auricular orifice was almost entirely obliterated; the orifices and valves of the heart were free; the brain was very firm and much injected.

It is probable that the dilatation of the right cavities of the heart of this child resulted from the hypertrophy and contraction of the left, which did not receive the blood, that was obliged to reflow into the opposite ventricle and auricle, and thus inordinately distend them. There occurred in this case that which is observed in adults who exhibit contractions or calcareous productions at the valves or orifices of the ventricles or auricles.

I have not seen an aneurism of the large vessels at this early age. Once, however, I saw in a child of eight months, who had a protuberance at the dorsal region of the vertebral column, the arch of the aorta and the commencement of the descending aorta much more dilated than in an ordinary state. This appeared to me to arise from the difficulty with which the blood passed through the vessel, for the artery itself followed the inflexion of the vertebral column.

I once met with an aneurism of the ductus arteriosus in an infant at birth; the following is an account of this case:

CASE LXXVIII.—*Aneurism of the ductus arteriosus.*—On the 25th of October, 1826, there was brought to the *Hospice des Enfants Trouvés* a male infant, aged two days, who, on the following day, was placed in the infirmary. He was of a medium size and constitution; the respiration was laborious; face livid; cry smothered; temperature of the body natural; pulse small, frequent, and easily compressed. This child remained two days in the same state, and died on the third, without having presented any other symptom than those just indicated. On examining the body, the mouth and œsophagus were found healthy; the intestinal tube the seat of a very great sanguineous congestion; the liver was gorged with blood, as were also the two lungs.

The heart was larger than is usual for an infant at birth; the two

lateral cavities were nearly equally dilated, and were filled with black clotted blood; the ductus arteriosus existed in the form of a large cherry-pit; its transverse diameter was about three lines and a half, and its circumference nine; from an external examination it appeared to open widely into the aorta; this size, however, existed only exteriorly, for the interior of the tumor was filled with fibrous clots, organized and disposed in layers, as is seen in aneurismal tumors of adults, leaving in the centre a very small hole.

The other organs of the body exhibited nothing peculiar.

I do not believe that the symptoms observed in this child were the effect of this aneurism of the ductus arteriosus; it can be more easily accounted for by the state of the lungs, and I do not think that any external sign could reveal the existence of this disease. I have only recorded it as a case of rare occurrence. M. Baron informs that he has also met with a similar case of aneurism in an infant, where the symptoms also presented nothing peculiar.

Inflammation of the heart and large vessels in infants at the breast is very rare, and doubtless very difficult to ascertain. I am not in possession of any positive data on this pathological point; I shall confine myself here to some observations on the color of these organs.

The external surface of the heart is usually of a deep red in young infants, and its extreme paleness ought to be regarded as an abnormal state. The internal surface is also of a red color, more or less deep, and sometimes there is a marked difference between the two ventricles; the right cavities are of a violet, and they have been seen of the color of Campeachy wood, while the left cavities preserve their ordinary red aspect. In these cases the venous blood predominates; the larger vessels are gorged with it, as well as all the tissues; putrefaction, even when much advanced, does not produce the same effect; and it does not show itself more in all subjects where there exists a considerable venous congestion. This difference of color, which I have also observed in adults, arises from some cause with which I am unacquainted; I shall therefore confine myself to pointing out the effects of it.

The vascular system of a young child is remarkable for its habitual sanguineous turgescence; it is also very common, in young infants, to meet with engorgements, ecchymoses, and san-

guineous effusions in different parts, but particularly in the most dependant, and in those where there is much cellular tissue. The vessels, notwithstanding their fulness, are not always colored with the blood contained in them; and when their branches are followed into organs, the tissue of which is impregnated with a large quantity of blood, they are often seen almost white, or of a slight rose color, in the midst of the tissue. I have been led to this remark by the anatomical researches which I made to satisfy myself whether these vessels in young infants partook of the coloring of the organs to which they passed, as M. Trousseau has observed was the case in a number of animals he examined.

§ II. PERICARDITIS.

If inflammation of the proper tissue of the heart is rare or difficult to prove in young infants, inflammation of the pericardium is more common. Perhaps it is even more frequent at the first period of life than at any other; in nearly seven hundred post mortem examinations which I made at the Hospice des Enfants Trouvés, I have seen seven well-marked cases of pericarditis.

The causes of this disease are difficult to explain, particularly if we compare them with those which produce it in adults. It is well known that Pinel has pointed out among the causes the immoderate exercise of the mental powers, and in support of this assertion has cited the history and death of Mirabeau, whose youthful hilarity and great moral activity appear to have, for a long time, disposed him to the pericarditis, which caused his death;* but nothing of this kind is to be observed in the vegetative life of new-born children, who, however, die of this disease. It is sufficient, then, that the functional activity of the heart is increased, and the irritability of the organ redoubled, for its serous envelop to become inflamed and give rise to the most serious accidents. This is undoubtedly the cause of the frequency of this disease in those affected with aneurism, and in nervous females who are subject to palpitations.

The symptoms of pericarditis in young infants are not easily recognised, because they may be confounded with those of pleurisy, meningitis, or gelatinous softening of the brain.

* *Nosographie philos.*, t. ii., p. 44.

In general, children affected with this disease appear to experience violent pain; their cry is painful; respiration labored and sometimes suffocating; the face is pinched; the muscles of the face appear to be constantly contracting. I have, in two instances, seen spasmodic movements of the limbs. Pericarditis is usually very rapid in its progress, and children die without exhibiting symptoms more strongly marked than those just described. It is, then, almost impossible to make a diagnosis of this disease; yet we may make a remark with regard to the subject before us: it is, that when there exists a state of general restlessness, distress, and suffering, in young infants, there is almost always a gelatinous softening of the stomach, pericarditis, or acute pleurisy; and our judgment must be directed to a decision between these three different diseases, when we see these symptoms in a young infant. The pulse does not exhibit any thing worthy of remark; it is the same with regard to percussion and auscultation; and therefore in every case of pericarditis which I have seen, it has not been possible to establish, by evident signs, a diagnosis of the disease; the post mortem examination alone has demonstrated its existence.

I once saw, in an infant two days old, firm adhesions between the layers of the pericardium, producing the belief that they were the product of a former pericarditis, developed during the evolution of the fœtus. In six other cases there was a sero-albuminous effusion in the pericardium, white flakes adhering to the surface of the heart, and very slight bands between the two larger layers of the cardiac envelop.

The pericardium and the external surface of the heart very often present, in young infants, violet-colored petechiæ; a sero-sanguineous effusion, or even an effusion of pure blood, ordinarily accompanied this petechial eruption. I do not think that this lesion ought to be attributed to inflammation; it appears rather to be the effect of passive congestion. In general there is almost always found a certain quantity of serosity in the pericardium of young infants.

If it be possible to detect the existence of pericarditis, the treatment of it should be the same as that of pleurisy.

The thymus gland is susceptible of being affected with certain diseases during the short space of its transient existence. I have

never been able to observe any peculiar symptoms belonging to these affections; but on opening the bodies of children, I have seen it in two instances much tumefied, very red, and extremely friable. I considered it as the result of an inflammation which perhaps might have led to its suppuration or disorganization. M. Véron reported, in a memoir read by him to the Académie Royale de Médecine, at its sitting on the 26th of April, 1826, an instance of an inflammation of this gland, with the formation of pus in the interior of this organ.

I shall here finish my remarks on the inflammatory diseases of the respiratory and circulatory apparatus in sucking children. I ought perhaps to treat of emphysema of the lungs, asthma, and nervous affections of the respiratory organs generally; but emphysema of the lungs, although common in young infants, does not produce any peculiar symptom; and further, nervous affections of the circulatory apparatus do not belong exclusively to the diseases of infants; the history, therefore, of these affections should be referred more especially to works of general pathology, or to treatises particularly devoted to the diseases of the thoracic organs.

CHAPTER X.

DISEASES OF THE CEREBRO-SPINAL APPARATUS.

IF there be one point in the pathology of new-born children which can demonstrate the utility of considering together the science of organization, and the clinical observation of diseases, it is the history of the diseases of the encephalon. We shall see, indeed, what important modification of the organic condition of the brain of young infants is caused by the progress and nature of their cerebro-spinal diseases. Let us commence by taking a rapid view of the development of the spinal marrow and brain.

A great number of authors, from the time of Galen, have considered the medulla spinalis as an appendage to the encephalon; but Gall has revived the contrary opinion, which had been supported by Plato, Praxagoras, and Philotenus; and the immortal

works of Tiedemann confirm this idea of Dr. Gall. It is now demonstrated that the medulla spinalis is developed before the cerebrum, which is the expansion of the spinal marrow, and which originally is very small compared with the spinal prolongation.

About the third or fourth week, there is perceived in the cavities of the head and spine a grayish fluid; from the fourth to the fifth week, the medulla oblongata is distinctly seen, bending forward at the place of the union of the head with the spine; at this time, the spinal marrow is formed of two white threads, which gradually inclining backward form a kind of longitudinal groove, so that at seven weeks the medulla spinalis appears cleft in its whole extent; the rudiments of the cerebellum are then for the first time to be seen, and the cervical swelling coinciding with the appearance of the superior extremities. At the beginning of the third month, the medulla spinalis is still open at its upper half, and exhibits nothing more in the remainder of its extent than a longitudinal raphé, which is the mark of reunion of the two primitive cords; the tubercular quadrigemina are large, the thalami nervorum opticorum perfect, and the enlargement of the medulla very evident; at the twelfth week, the spinal marrow extends only halfway down the sacrum, the tubercula quadrigemina are united, and the medullary eminences are easily distinguished, together with the corpora striata. There exists an internal canal produced by the turning over of the borders of the medulla, which communicates with the fourth ventricle. This canal is obliterated by the formation of the cineritious substance, which is secreted in the interior, so that at the sixth month it is no longer found in well-formed embryos. At the fifth month, the corpora pyramidalia, pons variolii, and corpora striata, are very large, and the human embryo exhibits a caudal prolongation; it quickly diminishes as the development and elongation of the vertebral column, according to Tiedemann, rapidly takes place, whilst the medulla spinalis continues fixed in its place. At the eighth month, the spinal cord extends only to the fourth lumbar vertebra; it terminates in small nervous filaments, constituting the cauda equina. Finally, at birth the medulla spinalis and medulla oblongata, which is an appendage to it, exhibit their constituent parts very distinctly formed.

In fact, the corpora striata are observed forming a well-marked lateral projection, the cords of which penetrate into the thalami optici from the crura cerebri; and the pons variolii is found composed of fibres from the lateral parts of the cerebellum, and of those coming from the opposite hemisphere, and which are disposed in layers alternating with fibres directed obliquely from the corpora pyramidalia to the thalami nervorum opticorum.

While the medulla spinalis is undergoing these different evolutions, the cerebrum and cerebellum gradually acquire their proper form and organization. The cerebellum, which at first consists only of two laminæ turned towards each other, is produced by the enlargement of these two laminæ, which arise and are united above the fourth ventricle, and by degrees are arranged in branches and twigs, which are seen in the substance of this organ. From the corpora pyramidalia arise the thalami nervorum opticorum and the corpora striata, which terminate on the outside by a lamina, which is observed to be reflected from before backward, and from without inward, to form the cerebral hemispheres.

These membranous hemispheres are so short at the second month, that they scarcely cover the corpora striata; but in proportion as they increase in size they successively cover the thalami nervorum opticorum, the tubercula quadrigemina, and lastly the cerebellum. It is their inflexion on themselves which gives rise to the lateral ventricles. From this short view of the formation of the medulla spinalis and encephalon, we see that the cerebral mass is produced by the spinal marrow, of which, as Reil has observed, it is an efflorescence.*

If this be true, the medulla spinalis and medulla oblongata would at the period of birth exhibit an almost perfect development, and in the fulfilment of their important functions, whilst the cerebral lobes, less useful at this period of life, would be less advanced in organization; this is indeed what really exists. M. Tiedemann has remarked, with much reason, that in infants of the age of six, seven, eight, and nine months, the brain ex-

* For further details on the formation of the encephalon, consult Tiedemann, *Anatomie du cerveau contenant l'histoire de son développement dans le fœtus*; translated by A. G. L. Jourdan. Paris, 1823—Ollivier, *Traité de la moelle épinière et de ses maladies*. Second edition. Paris, 1827.—Serres, *Anatomie comparée du cerveau*.

hibits a homogeneous substance of a light red, in which it is difficult to distinguish the cineritious from the medullary substance. From numerous dissections, I am satisfied of the correctness of the assertion of M. Tiedemann. The following are the results of my researches on this subject:*

In a child just born, the medulla spinalis is white, its cineritious centre is not altogether of the same color as in the adult, but is more of a rosy hue, and softer. It is easy to unrol the two lateral cords of which it is formed. Its consistence is sufficiently firm to allow of its being cut smoothly.

The brain of a new-born child only resembles that of an adult in its general form; it differs entirely in its consistence and aspect. Its consistence is like that of paste, and will allow of being cut tolerably smooth; but it soon softens when in contact with air; its color is white, and there exists as yet no well-marked line of demarcation between the cineritious and medullary substance, so that in cutting the hemisphere horizontally, the centrum ovale does not appear as in adults. Yet the seat of the cortical substance may be discovered by the presence of a line less colored than the central substance, and which winds over the superficies of the brain throughout its circumvolutions. The white substance of the brain is generally very much injected, or has a large number of vessels passing through it. "In every part where we have found the gray substance accumulated in considerable masses in the adult," observes M. Tiedemann,† "as in the cerebral peduncles, corpora striata, thalami nervorum opticom, &c., I have observed only that the vessels were larger and more numerous than in those which are composed of medullary substance, after the period of birth. The parts which correspond to the corpora striata in the brain of a fœtus are composed of a white homogeneous substance, with a reddish tint, and penetrated by a number of large vessels. The cerebellum also does not present between these two substances as marked a difference as at a more advanced age; but yet they are more easily distinguished, and appear much sooner than in the brain."

* These details are inserted by Professor Orfila, in the 1st vol. of his *Leçons de médecine légale*. Paris, 1828.

† *Anatomie du cerveau contenant l'histoire de son développement dans le fœtus, etc.*; translated by A. G. L. Jourdan. Paris, 1824, p. 120.

As the child advances in age, the various constituent parts of the brain assume an aspect, form, and anatomical organization which they are to have during the remainder of life. From the ninth month to one year, the gray substance acquires a degree of vital energy, which doubtless results from the modification occurring in its texture ; it first appears of a rose-color, then red, brown, and lastly, of a reddish gray. It is to be observed that the parts of the cerebral mass which are the nearest to the medulla oblongata are also more advanced in their organization than those more remote—a natural consequence of the mode of organization of the cerebro-spinal apparatus, the development of which passes progressively from the medulla spinalis towards the encephalon.

It appears, therefore, that, from birth to the age of one year, the brain of a child is in a true state of transition, and that this organ, scarcely perceptible in the beginning, reaches its proper organization about the ninth or twelfth month. Is it not owing to this modification occurring in the brain of a child that the frequency of cerebral affections at this age is to be ascribed ? It happens also that at this period the teeth first make their appearance, and it has long been believed that convulsions and other cerebral diseases are to be attributed to this cause. This opinion, found in the writings of Hippocrates, doubtless derives its principal support from the respect and authority which the name of the father of medicine usually inspires. But whatever Hippocrates may have said on this subject, it is evident that the true cause of the frequency of cerebral affections in infants at the period of dentition, is in the brain. Dentition can be only one of the accidental causes of cerebral diseases ; the predisposing cause exists in the organic modifications supervening in the encephalon, and it is to this part that we ought to direct our treatment. Not only has the brain undergone, during the first year, the organic modifications just pointed out, but the exercise of its functions has also increased ; it has gradually acquired its control over the other organs, and it has become fit to receive from them the sympathetic indications with which it was before unaffected ; it is the centre and regulator of the sensations, and this influence is felt even in disease ; we frequently see, during the first periods of life, great alterations in the organs, unaccompanied by any febrile reaction, any general symptom, or any mor-

bid sympathy; but at the age of which we are now speaking, every thing assumes a new aspect; fever, which is scarcely ever seen in new-born children, here makes its appearance on the slightest cause; hence the restlessness, cries, spasms, nervous mobility, so common, so easily excited, and at the same time so transient, in children who have passed the period of infancy. These considerations will prove to us the difficulty of studying the diseases of early infancy; the cause is evidently in the organic imperfection of the encephalon, which cannot reveal to us the signs and external symptoms of these diseases.

Whilst the medulla spinalis is undergoing its organization, the vertebral column has also passed through its periods of formation in nearly the same manner. The spine, according to Meckel, is, in the beginning, in the form of a groove, continuing open posteriorly for some time, and which closes by the union of the lamina of the spinous processes. The cranium is, at first, entirely membranous; its ossification commences early about the foramen magnum; the different bones composing it exhibit in the centre a primitive point of ossification, extending by radiation towards the circumference of the bone, the borders and angles of which are still separated at the period of birth, by cartilaginous or membranous intervals, which permit the different parts of the cranial cavity to move over each other with great facility.

The membranes of the spinal marrow and brain are formed very early, and present their peculiar disposition and form, so that at birth they possess all their vital and organic properties; their diseases, therefore, are similar to those of the meninges in adults, giving rise to nearly the same symptoms.

The arrangement of the vascular system of the brain and spinal marrow deserves the attention of physicians, for the disturbances which supervene in the cerebro-spinal circulation may arise from the disposition of these vessels. There are the large meningo-spinal veins which pass up through the lateral parts of the spine, and also a network of veins, described by M. Breschet, between the dura mater and the posterior surface of the vertebræ. Besides these, there are veins of which M. Dupuytren has given an account under the name of *Medulli spinales*, and M. Chausier under that of *Médianes rachidiennes*, particularly destined

to the spinal marrow. There is also behind the dura mater a thick layer of cellular tissue, which, in young infants, is infiltrated with a yellow serosity, the consistence of which is sometimes gelatinous, and must not then be considered as a morbid production. The network of spinal veins is almost always engorged with blood, arising, without doubt, from the lentor with which the venous circulation of the spine is affected at this period of life; the arteries present nothing peculiar.

M. Magendie has recently observed that there exists between the pia mater and the tunica arachnoidea, which is reflected on itself, a space of greater or less size, which, as M. Ollivier remarked, is interrupted at intervals by small thin ligaments, and where there is constantly during life a serous fluid, communicating, as M. Magendie observes, with the fluids of the cerebral ventricles;* the pia mater, which is essentially vascular, while the tunica arachnoidea is without vessels, is less adherent to the surface of the brain in children than in adults; it has likewise been remarked that the pia mater of the medulla is more cellular and solid than that of the brain, and Bichat has observed that this membrane becomes thicker at its inferior part; in order, therefore, to satisfy ourselves of the state of softness or firmness of the medulla spinalis, we must always remove from it the pia mater, which can easily be done.

The brain and spinal marrow are, during life, in a state of continual movement, elevation, and depression; the motion of the spinal marrow was a long time unknown; the demonstration of it is due to M. Ollivier, and who has, I think, very satisfactorily explained its mechanism. There are, says he, three very evident causes which produce the motion observed throughout the whole length of the spine; first, the shock of the part from the action of respiration on this organ, next the dilatation of the vessels when there is an afflux of blood, and lastly, the motion of the spinal fluid by each respiration.†

The primary anatomical and physiological data being established, let us pass to the study of the congenital malformations of the cerebro-spinal apparatus. My object is not to give a com-

* *Journal de Physiologie Expér. et Path.*, tome v.

† Olliv. *loc. cit.*, page 43.

plete history of them, but to consider them in their relation to the symptoms of the diseases of infants.

Congenital malformations.—The complete absence of the medulla is called amyelia; it would appear that its absence is always coincident with that of the brain. Morgagni has given several instances of the simultaneous absence of the brain and spinal marrow. M. Ollivier has reported, in the scientific journals, nearly all the facts upon this subject, and it has been remarked that, in nearly all the individuals affected with this deformity, spina bifida was found more or less complete. Yet it must not be concluded from this that the absence of the parts contained will always produce that of the containing parts, as MM. Serres and Geoffroy Saint-Hilaire have thought. Still the coincidence is not uncommon. Every thing leads to the belief that the absence of the medulla is the result of disease rather than the effect of an arrest of development. I shall not consider the reasons with which Béclard, MM. Meckel,* Ollivier, Dugès, and a number of others, have adduced in support of this opinion. I will only observe that there are many cases in confirmation of it.

The medulla spinalis may exhibit a deformity at its upper extremity; in the case of anencephalia, the pons varolii exists, or may present nothing more than the rudiments; sometimes the spinal cord exhibits a trace, more or less deep, of its division into two lateral portions, or it is suddenly obliterated near the fourth ventricle. Children affected with this deformity do not die immediately after birth, for the heart and lungs, which receive their nervous influence from the upper portion of the medulla, may perform their functions for some time in a manner that will preserve life for many days. Indeed such children have been seen to respire, cry, suck, and swallow.

The division of the medulla spinalis into two lateral cords, to a greater or less extent, which Zacchias, Manget, and Hall have pointed out, and which I also have given an instance in the work of M. Ollivier,† may exist with complete spina-bifida, although the skin may be perfect at the place of the separation of the vertebra; this malformation will not allow of the establishment of

* Manual of General, Descriptive, and Pathological Anatomy. Philadelphia, 1832.

† *Loc. cit.*, t. i., p. 167.

independent life, and children thus affected die immediately after birth, or give no sign of life; another malformation consists in the doubling of the medullary portion, and is particularly met with in fœtuses that are double. Lastly, in the centre of the medulla spinalis may be a canal, the effect of a mechanical distension which this organ may experience from the serosity accumulating in the centre of the cerebral cavities, in cases of hydrocephalus or hydrorachis.

Hydrorachis consists in one or more tumors situated in the vertebral column, over an opening between the spinous processes, resulting from an accumulation of serosity contained in a sac formed by the skin and the meninges.

In hydrorachis, the tumor may be situated at the superior, middle, or inferior part of the vertebral column; its form may be of that of a chestnut (*marronée*), oblong, irregularly round, or multi-lobed; its consistence that of a cyst, enclosing a fluid which disappears more or less on slight pressure, flowing, no doubt, towards the brain. This pressure is generally painful. Wherever it may be seated, it exhibits three stages or varieties of aspect, of which the distinction is really of practical utility. 1st, The skin covering it is healthy, like that of the other parts of the body; the seat of the disease, the fluctuation, and the sensation of an opening between the vertebræ, are the only signs by which the existence of hydrorachis can then be ascertained. This variety evidently demonstrates that the skin concurs in the formation of the walls of the tumor. This form of the disease is less dangerous than the others, and may continue a long time without any serious consequences. 2dly, The skin is sometimes very thin and transparent, and crossed by purple lines; in some cases there oozes out a sero-purulent or sanguineous fluid, which indicates the approaching rupture of the tumor. 3dly, The tumor may be open, presenting, at the bottom, a very fine perforated membrane, and allowing of the escape of a quantity of variable fluid. There is a red rugous ring surrounding this rupture, formed by the skin and subcutaneous tissue. This ring is harder where it is near the edges of the vertebral bifurcation.

The two last varieties are much more common than the first; and as infants are almost always born with spina-bifida in a state of ulceration, some authors have thought that the skin formed no

part of the walls of the sac. In seven cases of spina-bifida, observed in the wards of the hospital, in 1826, I saw two where the tumor was covered by perfect skin; one of these children lived two months, and died from pneumonia. In the other, the tumor was ulcerated, and by degrees assumed the appearance which it usually has.

The opening of the tumor accompanying hydrorachis, is always a most unfortunate circumstance, for inflammation of the meninges quickly follows, and all its train of bad consequences, even death itself. If a child, therefore, be born with an ulcerated tumor, but incompletely perforated, it ought not to be opened in order to effect a discharge of the fluid. Morgagni has reported a fatal instance from this operation, which an ignorant physician performed, in opposition to his advice; scarcely was the tumor opened when the child became prostrated, and on the third day died. "*Non vixit autem ad totum tertium ab inciso tumore diem. Ex quo enim hic incisus est, nunquam flere et clamare destitit, qui antea hilaris esset ac ridibundus et mamman ferè arevsari cujus semper appetens fuisset.*"*

In seven children affected with hydrorachis and spina-bifida, who died, there were five who exhibited spinal meningitis. Those in whom the tumor was not perforated, remained for some time without exhibiting the slightest symptom; but immediately after the destruction of the walls of the cyst, the fluid flowed out and convulsions followed, which continued until death; where there has existed a perforation of the tumor, the convulsions have commenced at birth, and continued until the death of the child; it is evident, then, that death in this case was caused by spinal meningitis, which soon extended even to the brain.

In dissecting the vertebral column and the tumor of the children affected with spina-bifida, I found in five of them an abundant effusion of serosity in the scull and spine, so that it is probable that the separation of the vertebræ, and the tumor following it, are the ordinary results of this accumulation of serosity, or of this encephalo-spinal dropsy. In two children in whom the tumor, which was small in size, was situated in the sacral region, and which was covered with unbroken skin, the brain was perfectly healthy, the ventricles had not been distended, and there

* *De sed. et caus. morborum*, lib. 1, epist. xcii., p. 193.

existed no serosity except in the spine. The medulla spinalis was perfectly healthy. Does not this integrity of the brain, which coexisted with the slightly advanced stage of the tumor, prove that the disease commences sometimes in the spine? I have investigated with great care the seat of this serosity, and it appeared to me to exist in the cavity of the tunica arachnoidea. In one instance, it was between the tunica arachnoidea and the pia mater. The seat of this dropsy will therefore be different from that of the cerebro-spinal fluid of M. Magendie; and would not this circumstance lead to the belief that there exists a serous fluid, not only between the arachnoid membrane and the pia mater, but also in the arachnoid cavity itself? I did not find this fluid thick, turbid and flocculent, except in the five cases where symptoms of meningitis existed. It was limpid and without foci in two others, where death occurred from another cause.

I have not always found a perfect communication between the spinal and cranial fluid. The following case exhibits, in this respect, a very peculiar disposition.

CASE LXXIX.—Alexandrine Depuis, aged two days, entered the infirmary on the 7th of May; she was small and very feeble. She had, at the lower part of the back, an elongated tumor, an inch and a half long and an inch wide, the walls of which, without being open, were purple and very thin; she was not affected with convulsions; the limbs were œdematous; and the cry, at first strong, became by degrees husky and stifled. This child died on the 8th of May. On a post mortem examination, the œsophagus was found ecchymosed; the stomach and intestinal tube slightly injected; the liver healthy; the gall-bladder empty; the left lung engorged; and at the commencement of hepatization, the heart gorged with blood; the ductus arteriosus widely open. Around the spinal tumor there existed some blood effused in the cellular tissue. The separation of the vertebræ existed at the lumbar region; the fluid contained in the tumor was bloody; it was easily made to flow through the whole length of the spinal marrow, and it evidently flowed between the tunica arachnoidea and pia mater. The lateral ventricles contained fluid which, instead of being red, was, on the contrary, of a transparent citron color. This fluid penetrated into the middle ventricle, and the aqueduct of Sylvius, a little dilated, permitted it to descend into the fourth ventricle, beneath which was a small red pouch,

thin and flexible, about the size of a small hazelnut. It formed a cul-de-sac, which interrupted all communication between the brain and spine; when it was pierced, the fluid flowed out, and it immediately collapsed.

This case exhibits to us a double peculiarity; the seat of the effused fluid, which was found at the place of that described by M. Magendie, and the evident interception between the brain and the spine. I found, in another child who died of hydrorachis, the fluid effused throughout the spine of a yellow color, and having left a deposit of the same color on the surface of the meninges, whilst the serosity of the brain was as clear as it usually is.

Although these facts appear to be contradictory, yet we can ascertain from them one consequence, that the fluid of cephalo-spinal dropsy is sometimes effused between the tunica arachnoidea and the pia mater, and sometimes between the two folds of the tunica arachnoidea; it is even probable that the source of the secretion is in the canal described by M. Magendie, and that it is introduced either by ruptures of the arachnoid membrane, or by exudation on the outside of the canal, which had become too narrow to contain it. Such, also, is the opinion of M. Ollivier. The communication of this canal with the brain appears contradicted by the fact which I have just stated; yet, as it is the only one, so far as I know, which has yet been published, I regard it as a simple exception. Besides, it may be observed that the large and free communication existing in the case of spina-bifida, between the brain and spine, is always the effect of the progress and of the abundance of cerebro-spinal effusion.

The medulla spinalis usually remains healthy in the midst of this effused fluid; sometimes, however, it is found soft, like the walls of the cerebral ventricles in hydrocephalus. It may at the same time present some of the malformations which we have pointed out.

There are generally no symptoms, when the tumor has no communication with the air, and when the fluid does not compress the brain or spinal marrow so as to interfere with the exercise of their functions. Individuals with this disease have lived to quite an advanced age without experiencing any unto-

ward consequences; but when the tumor is open, spinal meningitis, which soon supervenes, gives rise to all the symptoms which it usually produces.

Gentle and gradual compression of the tumor is the only treatment that can be adopted; for experience has not as yet justified either the practice of opening the tumor at several intervals with a fine needle, nor the method of passing a seton through it: for inflammation of the meninges almost always soon follows such a practice.

Among the congenital diseases of the medulla spinalis, may be mentioned an icterous affection of this part, and which M. Lobstein has described recently under the name of kyrronosis, and of which he has seen two instances in embryos of five months.* This author is of opinion that it is a disease peculiar to the first period of intra-uterine life; but I shall give several instances of a yellow coloring of the brain and spinal marrow, when speaking of icterus, which appear to me to have a great analogy to the kyrronosis of M. Lobstein. The disease may, therefore, be observed at other periods than those indicated by the learned anatomist of Strasburg.

Congenital malformations of the brain and cranium are of frequent occurrence. I do not intend here to give their history, causes, mode of formation, and nomenclature, but only to consider them hastily in their relation to the study of the symptoms belonging to the diseases of young infants.

Acephalia, which consists in the absence of the brain and even of the medulla oblongata, is seen only when the head, face, and upper part of the neck are wanting at the same time; in such a case life cannot be established, and the fœtus had only existed by its communication with the circulatory apparatus of its mother, dies as soon as this communication is broken off. The respiratory and circulatory apparatus are at the same time wanting, or are incomplete.

Anencephalia also deserves our attention. It consists in the absence of one part of the brain, with or without the absence of the cranial cavity. It is so common to meet with a deformity of the cranium, with a deformed brain, that the most celebrated anato-

* *Répertoire d'anatomie général*, 1st vol. Paris, 1826.

mists, and among them M. Geoffroy St.-Hilaire, have established it as a general law that when the containing part is deformed or wanting, all the contained parts are at the same time but little developed, or are badly formed. But several contradictory facts have already disturbed this principle, and I could myself give a very remarkable instance.

Anencephalia presents different degrees. It exists from a species of atrophy of the cerebral hemispheres, which is seen in idiots, to the complete absence of the cerebral mass. I have seen it in several degrees. Thus, I once saw a child where the forehead and summit of the head were considerably flattened. From this disposition of parts, M. Baron made a diagnosis of the existence of anencephalia, having in others observed the same with an absence of brain; and upon a post mortem examination we found only the cerebellum, thalami nervorum opticorum, the third and fourth ventricles; the fornix was separated at its middle. The posterior part of the hemispheres was sufficiently developed, but they were deficient anteriorly, leaving exposed the anterior part of the lateral ventricles. This child lived forty days, cried, respired, and sucked without difficulty; this case has been reported at length in my thesis.* I have also seen a child who came into the world with the cranium very irregularly developed; there was no doubt of this being a case of anencephalia. It died in three days, and on opening the cavity of the cranium, instead of finding the brain regularly formed, there was only a sac formed of the meninges, on the surface of which the vessels appeared as usual; this sac contained a bright yellow fluid, liquid and inodorous, like serosity. When it had flowed out, the cerebellum could be seen at the bottom of the cranium, covered by the tentorium, the rudiments of the falx cerebri, the medulla oblongata, the thalami nervorum opticorum, and the corpora striata; on the outside of these floated some pulpos fragments, which appeared to be the rudiments of the cerebral hemispheres. The pia mater, which formed the internal tunic of this cerebral cyst, was covered here and there with a great

* See the dissertation on viability at the end of this work.

number of pulpos and cerebiform flakes, which it was said had been secreted by it.*

In this case, notwithstanding the integrity of the bones of the cranium and the considerable number of vessels of this organ, the brain only existed in a very imperfect state, and exhibited the deformity peculiar to anencephalia. Anencephalia had not in this instance been caused by any exterior mechanical influence, nor by default of development of the vascular system, which, according to the doctrine of M. Serres, exists before the formation of the organs; and every thing leads to the belief that a dropsical or some other disease of the brain had suspended its development, or had caused its disorganization, at a period more or less remote from its formation. But what is more important for us to note is the entire absence of all symptoms which would enable us to recognise the existence of this disorganization, and the continuance of life for so long a time, with the absence of so great a portion of this important organ.

The most usual degree of anencephalia is that where the cranium and the brain are both wanting, the upper part of the cranium being open; the ossa frontis are wanting, or are much mutilated, and there is scarcely a trace of the ossa parietalia. A shapeless cerebral mass, covered by red and bloody membranes, is situated at the base of the cranium, which is usually found nearer the shoulders than in a natural state; the projection of the orbital arches and of the eyes, the face which presents some analogy to that of the head of certain of the lower animals, to which the vulgar will sometimes compare these children; such are the ordinary traits of an anencephalous infant, in whom is often found nothing more than the medulla oblongata, and sometimes the cerebellum, and the remains of the thalami nervorum opticorum and corpora striata. The causes of this organic deviation have been very learnedly discussed by Haller, Sandifort, Sæmmering, Klein, Otto, Meckel, Tiedemann, Béclard, Breschet, Geoffroy, St.-Hilaire, Serres, and Andral. The analytical examination of the facts which they have made known, and the consequences which they have deduced from them, would re-

* M. Breschet has given some analogous facts in the article *Hydrocephalie*, in the *Dict. de méd.*, in 21 vols.

quire a long dissertation, and lead us too far from the main object of this work. I will therefore draw but one conclusion, which is, that most anencephalous children, even though born before the full time, and being otherwise well constituted, have for the most part lived one day, and even for a longer time; and have thereby proved that it is sufficient for the medulla oblongata and medulla spinalis, whence arise the nerves essential to organic life, to be in a certain state of integrity, to preserve life during the foetal evolution and for some time after birth.

Congenital hydrocephalus is in all probability the result of an inflammation of the meninges during intra-uterine life, or of some malformation difficult to ascertain, bearing some resemblance to a nutritive hyperthrophy of the encephalon. This idea is favored by the development of the cerebral mass and the bones of the cranium in hydrocephalic foetuses. These bones acquire a breadth and thickness, not only resulting from inflammation of the meninges, (this circumstance alone cannot explain the phenomenon,) but it evidently shows an increase of nutrition, which may be regarded as one of the causes of hydrocephalus. It is worthy of remark, that after birth, children, where the brain and cranium are very much developed, are also much exposed to hydrocephalus. The vital activity, or the power of nutrition developed with more energy than in a natural state, ought doubtless to be taken into consideration, as one of the possible causes of congenital hydrocephalus.

There are, however, different varieties of hydrocephalus: that where the cranial cavity takes no part in the dropsy of the brain, the substance of which is found to be more or less destroyed, and this was the case in the instance of anencephalia which has just been mentioned; that where hydrocephalus supervenes at a more advanced stage of foetal formation, and the cranium and brain are destroyed or deformed; and lastly, the most common form of the disease, that where there is with it a considerable development of the bones of the cranium; this last variety appears to me evidently owing to a kind of cerebral and cranial hypertrophy, not observed in other cases. This nutritive hypertrophy, by increasing the power of formation in the encephalic mass, will augment the activity of the secretion from its membranes; hence

the abundance of fluid at the same time that the organ augments in volume.

The causes of the normal development of the viscera are connected by insensible degrees with the causes of their anomalies, and it is easily conceived how it happens that this species of vegetative life with which our organs are endowed at the period of their formation, on receiving an increase of energy may, in some way, pass the limits of their regular state, and thus cause congenital malformation, which ought not always to be attributed to diseases similar to those developed after birth. If we can ascertain that monstrosities supervene when the development is arrested, why may we not attribute certain others to an overgrowth of the same development?

Be this as it may, congenital hydrocephalus consists in a very abundant effusion of serosity in the distended ventricles of the brain, the size of which is increased one third and a half, and the substance of which, more or less firm at the circumference, is always so where it is in contact with the fluid. The latter does not always remain enclosed in the ventricles; it is sometimes found effused in the arachnoid cavity; hence the distinction, which is very slight, between hydrocephalus internus and hydrocephalus externus.

This disease often coexists with hydrorachis; children then have one or more tumors along the vertebral column, and an enlarged head. It is very difficult to tell which of these two diseases exists primarily; perhaps they are both simultaneously developed under the influence of the same cause. Well-marked inflammation of the meninges does not always accompany congenital hydrocephalus. Like hydrorachis, it is observed to arise and produce its peculiar symptoms when an external cause, like the introduction of air from an opening, in spina-bifida, causes an irritation of these membranes, which is generally rapid in its progress. Hydrocephalus may exist in an infant at birth without giving rise to any morbid symptom. It is in some even accompanied with a very remarkable degree of intellectual activity, and this is an additional proof of the truth of the assertion just made relative to the causes of this anomaly. Indeed if we follow for a greater or less time the causes and progress of this disease, we shall see that it at first consists of an increase of organic energy, which gives to the

brain and cranium a size and form which in its study affords so much pleasure to physiologists, because it is the presage of a high intellect—a presage which appears to be well founded, as the child soon astonishes by its instinct, the justness of its judgment, or brilliancy of its wit. But if the cause of such organic and functional energy continues to act, it reduces both the organ and its functions to a state of destruction and annihilation, soon to be succeeded by death itself.

Hydrocephalus may remain stationary, and continue to an advanced period of life. It would seem, from the observations of Camper, that children in whom the bones of the cranium are not separated, live a much longer time than those in whom there exist large fontanelles and a considerable separation of the sutures of the bones. It often coexists with a congenital malformation of the vertebral column, or of the limbs; rendering the individuals who are affected with it either idiots, if the cerebral substance be much changed, or remarkable for their genius, if it continues in a slight degree, and if the cerebral activity does not exceed the limits, to us unknown, beyond which intellect is perverted. It is useless to describe the form of the cranium, and the expression which the accumulation of water in the ventricles imparts to the physiognomy; the *facies* of those affected with hydrocephalus is well known.

I believe that it is difficult to establish a proper treatment in this disease. How, indeed, can the nutritive activity be suspended in the affected organ, and cause the absorption of the effused fluid? Yet authors have advised various means for effecting this, among which is friction with mercurial ointment: it was for the first time employed by Armstrong; and Lefebvre de Villebrune has recorded, in his translation of Underwood, several cases by Armstrong and Hunter, where the efficacy of this method is made very evident.

But it is to be remarked that the subjects of these cases were of an advanced age, and that their symptoms were more properly those of acute or chronic meningitis, than of a simple effusion of serosity in the cerebral ventricles. I think, therefore, that it is useless to attempt any therapeutic means when hydrocephalus causes no special symptoms; but we ought to confine ourselves to the directions of hygiene, the object of which will be to re-

move every thing that would increase cerebral excitement. If meningitis should supervene, we must have recourse to the measures already advised for this disease.*

In order to finish the history of congenital diseases of the cerebro-spinal apparatus, it remains for me to speak of fractures and malformations of the vertebral column and bones of the cranium.

I have already mentioned the default in the union of the spinous processes of the vertebræ, and shall now say a word on their gibbosity. This is of rare occurrence in infants at birth; but it is usually developed after that period. Yet when the vertebral column of a young infant is examined, a peculiar disposition is found in some, and which might be the predisposing cause of the malformation of which I am speaking. This disposition consists in a sort of backward displacement of one or several of the dorsal vertebræ, which, instead of being in a parallel line with the others, exhibit a slight depression. I have only remarked this in two infants at birth, and this disposition was perhaps the commencement of gibbosity.

The bones of the cranium present, in infants at birth, either malformations or solutions of continuity. The former are the result of an arrest of development. I have collected three cases of remarkable ossification of the cranium; the osseous fibres, instead of passing from the centre to the circumference of the bone, were interrupted and disposed in small isolated masses, between which was found a cartilaginous substance. When these bones were felt through the integuments, they appeared as if fractured or ground. In another instance, I found in a new-born child a considerable depression at the anterior inferior part of the right parietal bone, which appeared to have been produced by some mechanical compressive cause applied to the cranium during the process of ossification.

Lastly, the bones of the cranium are subject to present fractures in different parts, when the head has undergone much diffi-

* To the alterations of the brain, which we have just studied, we may subjoin, as an instance of congenital hypertrophy of the dependant parts of the brain, the two facts reported by Chaussier. In an infant stillborn, the head of which was well formed, he found the pineal gland compact, elongated, and as large as the extremity of the little finger of an adult. In another it was larger than in adults. *Procès verbal de la distribution des prix aux élèves sages-femmes de la Maternité*, 1812. (See Appendix.)

culty in passing through the straits of the pelvis, or when we have been compelled to terminate the labor by the use of forceps. Professor Chaussier and M. Dugès long since published instances of this kind of lesion. These fractures are almost always accompanied with cerebral congestion or apoplexy; this complication ought to fix the attention of the practitioner more than the fracture.

The bones of the cranium sometimes leave between them large spaces, either because they are not sufficiently developed by reason of the great size of the brain, as is observed in hydrocephalus, or because the development has been arrested. The fontanelles are, in consequence of this, very much spread, allowing a greater or less quantity of the brain to project, forming a real hernia. This disease is a very serious one; it almost always co-exists with hydrocephalus, the progress of which soon causes the death of the child. The nature of this hernia is easily ascertained, particularly from its situation, for it always occupies a point corresponding with one of the fontanelles, and principally to the superior and anterior one. We must be careful neither to compress nor pierce this tumor; it ought to be loosely covered, that the friction of the clothes or of external bodies may not produce excoriation and inflammation. There is another species of hernia, which is much more rare, and I have met with but one instance of it, and I am not aware of any thing similar in the works of authors.

CASE LXXX.—*Congenital malformation, hernia of the brain.*
—Marianne Masse, aged one day, entered the infirmary on the 22d of June; she was of medium strength; the integuments were very red; she had no other symptom than diarrhœa; the cry was strong, and the respiration free. She had on the lateral part of the left side of the face, before the ear, a tumor half an inch in diameter, very round, more projecting inferiorly than superiorly, where it was confounded with the skin of the cranium, whilst inferiorly it presented a circumscribed prominent border. The integuments covering it were healthy, and of a vermilion color, like the rest of the face. It was painful and slightly soft to the touch; the forehead, very much depressed above, formed a considerable prominence in front; the eyelids were sunk in the orbits, and their approximation

prevented the globe of the eye from being distinguished ; an oblong vermilion cicatrix, with slightly prominent edges, and apparently but recently consolidated, existed at the left lateral part of the cranium. This child remained in the infirmary until the 20th of July, when she died.

On opening the body, there was found an acute inflammation of the digestive tube ; the respiratory apparatus was healthy.

The left hemisphere of the brain was about one third less than the right. Neither the longitudinal sinus nor the falx of the brain were found upon the median line of the cranium, but they were directed obliquely from the centre of the forehead to the lateral left part of the occipital fossa ; all the left portion of the hemisphere, which is usually lodged in the middle lateral fossa of the base of the cranium, was thrown backward in a species of sac, formed of the tunica arachnoidea, the dura mater, and the skin. This portion of the brain formed the tumor of which I have spoken ; it issued from the cranial cavity by a tolerably large opening, which resulted from the absence of the squamous portion of the temporal bone. This portion consisted of nothing but an edge of not more than two lines in extent, and which was curled below like the shell of a snail ; the angle of the parietal bone existed, and formed the upper part of the opening. The meninges and the cerebral substance were very much injected.

This hernia was evidently the result of compression which the cranium and brain had experienced during intra-uterine life ; the defect in the development of the squamous portion of the temporal bone was doubtless caused by the compression which the corresponding part of the brain had exercised on it. I have already considered some of the possible causes of this hernia, when speaking of the congenital diseases of the skin.

ART. 2.—Diseases of the cerebro-spinal apparatus, developed after birth.

§ I. CONGESTIONS.—Passive congestions of the cerebro-spinal apparatus are very common in infants at birth. This arises from the abundance of vessels, the slowness of the circulation, and the influence of respiration on the spinal and cerebral circulation. The length of the labor, the necessary tractions in certain manœuvres, the difficulty with which respiration is established, the changes which the circulation undergoes, explain how this ap-

paratus is so often the seat of sanguineous congestions, varying from simple injection of the meninges to true apoplexy.

By the general term apoplexy in new-born children, is meant several degrees of cerebral congestion; and for the most part, children dying in an apoplectic state do not, on a post mortem examination, exhibit the effusion of blood, or the circumscribed cerebral hemorrhage which constitutes the disease described under the same name in adults. Let us, therefore, consider the various lesions which belong to this disease.

Injection of the meninges, of the medulla, and of the brain, is so common in infants at birth, that it has appeared to me more proper to consider it as a natural rather than as a pathological state. It is found in most dead bodies; vascular injection, and even effusion of blood at the inferior and posterior extremity of the spine, are very frequent. I have often seen it without its having given rise, during life, to any appreciable symptom.

If the injection is continued too long, it will soon produce an exudation on the surface of the meninges; and the blood which is the product of this exhalation, is ordinarily coagulated in a greater or less quantity, compressing the brain and spinal marrow, and causing the state of stupor to follow which is characteristic of apoplexy. This hemorrhage, exterior to the cerebral mass, is almost always met with in infants who have died of apoplexy. This is what M. Serres calls meningeal apoplexy, and which he attributes to the rupture of some one of the vascular branches which wind over the surface of the brain.

Injection of the cerebral pulp is equally common; it exists under the form of a spotted redness, sometimes coloring deeply the substance of the brain; it usually exists on the lateral parts of the corpora striata and thalami nervorum opticorum. It is in this part that the cerebral vessels exist in the greatest abundance, and which is more generally affected with hemorrhage and inflammation at every period of life; the works of Morgagni, and the recent researches of MM. Lallemand* and Bouillaud,† have rendered this fact incontestible.

Lastly, it is possible, but it is very rare, to find cerebral hemor-

* *Recherches anatomico-pathologiques sur l'encéphale et ses dépendances*, Paris, 1820, 1829. Letters 1 to 6.

† *Traité de l'encéphalite ou inflammation du cerveau et de ses suites*. Paris, 1815.

rhage very circumscribed; I have met with but one case of it. This child died on the third day after birth, with symptoms of apoplexy. On a post mortem examination, there was found a sanguineous effusion in the left hemisphere, on the lateral parts of the corpora striata. There was no apparent cyst; the cerebral substance was a little softened in points which surrounded the effusion, the extent of which was one inch in length by half an inch in breadth.*

§ II. NON-INFLAMMATORY SOFTENING.—This is a lesion peculiar to the encephalon of new-born children, and is the result of congestion of this organ. This is a species of softening either general or local, which, far from presenting the characters of inflammation, on the contrary presents all the signs indicating decomposition, and we might almost say putrefaction, of this organ. I will here give an instance of this affection.

CASE LXXXI.—Alexis Louart, aged three days, entered the infirmary on the 18th of May. He was affected with a general induration of the cellular tissue; the integuments were of a violet red in all parts of the body; the cry was smothered, painful, and, at times, very acute. The chest sounded obscurely. He was, besides, affected with a very abundant diarrhœa. The pulsations of the heart were quick, but of extreme smallness. There was no change in his condition on the succeeding day, and he died on the twenty-first. On a post mortem examination, the digestive apparatus was found injected in almost its entire extent. The liver was gorged with black and fluid blood; its tissue was hard and of a brown slate color; the lungs were floccid, blackish, slightly dilated with air, and gorged with blood at their posterior edge. The fœtal openings still existed; the meninges were very much injected; the cerebral pulp was red, and reduced to a soft mass, which flowed freely on making an incision into the arachnoid membrane, diffusing a very evident odor of sulphuretted hydrogen. This softening extended even to the lateral ventricles, where was found a quantity of effused blood; the rest of

* A fact observed by M. Bérard, junior, proves that cerebral hemorrhage may occur during intra-uterine life; so that apoplexy ought to be mentioned among the number of diseases by which an infant may perish before birth, and bring on labor before the time. The fœtus in which M. Bérard has observed this remarkable alteration, was aged eight months and a half; the clot, about the size of a nut, was lodged in the substance of the brain. *Société anatomique*, 1828.

the brain was softened, and of a violet color, but was far from being soft, like that part of the hemispheres above the ventricles.

Here it is evident that this general disorganization of the cerebral pulp was the result of its contact and mixture with the blood effused in the ventricles, and infiltrated in the proper substance of the brain; for there almost always exists cerebral hemorrhage at the same time; but this hemorrhage, when recent, may exist alone, without any softening of the brain; there is only observed, at the superior part of the hemisphere, or at the corpora striata, the points of the encephalon, where the softening commences, and which already diffuses the odor peculiar to this disorganization. On the other hand, I am disposed to believe that the cerebral softening may precede the hemorrhage, and may even produce it, for I have several times found it without sanguineous effusion.

The softening of which I speak sometimes exists only in one lobe, at other times in both; very often the whole of the cerebral mass is so destroyed, that nothing more is found on opening the cranium but a soft flocculent black mass, mixed with a great number of clots of blood and pulpy flakes. It is a remarkable fact that the meninges are not involved in this disorganization, and that notwithstanding this destruction of the encephalon, children will still live some days, not possessing simply, as is vulgarly thought, a mere breath of life, but actually respiring, crying, and sucking; this occurs when the disorganization is arrested at the medulla oblongata, which remains unaffected, and which, with the medulla spinalis, controls the phenomena of life, even preserving it for some time.

I have often found this softening in new-born children that died immediately after birth, leading to the belief that it had its existence during the sojourn of the child within the womb.

When the medulla oblongata and medulla spinalis are thus softened, the child exhibits much less vital activity; the limbs are completely flaccid and immoveable; the cry is altogether annihilated; the pulsations of the heart scarcely perceptible; the limbs are cold, and deglutition almost impossible. The child soon sinks under this state of feebleness, and the post mortem examination reveals the disorganization of the entire ner-

vous centre, and thus explains the symptoms and death of the child.

This softening is more frequent on the lateral parts of the hemispheres and near the corpora striata, than at any other part of the brain. These symptoms are serious in proportion to their extent, and to their approximation to the medulla oblongata; the prognosis is a very unfavorable one, for death appears to me to be inevitable.

Such are the assemblage of the lesions, which the different stages and varieties of cerebral congestion in new-born children may present. The symptoms are usually characterized by a state of sinking, prostration, and sanguineous congestion of the limbs, body, and face, and especially by the proper signs of pulmonary congestion, which almost always accompanies that of the brain. It is difficult in young infants to ascertain the peculiar effects of apoplexy of the right or left hemisphere on the opposite side of the body; for, as I have observed when speaking of the development of the brain, this organ at the time of birth can hardly be said to be formed; it neither enjoys as yet the organic form nor the vital properties which it acquires in the progress of its development.

The treatment of cerebral congestions ought to be confined to sanguineous evacuations, produced by causing the blood to flow by the umbilical cord in infants, at the period of birth, or by the application of two, three, or four leeches to the base of the cranium. Every thing that can excite and accelerate the movements of the circulation ought to be removed.

ART. 3.—Inflammation of the Cerebro-spinal Apparatus.

It is without doubt a great advantage that the brain in children is one of the last of the viscera that becomes organized; for if at the period of birth it possessed all the organic and vital properties which is observed in the digestive or respiratory apparatus, it would be exposed to frequent inflammations. But its pulpy, and, we might almost say, inorganic state, renders it but little disposed to phlegmasia, which might be developed after the congestions of which it is always the seat at the time of birth. I can therefore affirm that well-marked inflammation of the cere-

bral substance is rare in new-born children. That of the meninges is more common; let us, then, commence with the study of meningitis.

§ I. SPINAL MENINGITIS.—Inflammations of the spinal meninges are always more frequent than those of the medulla; they give rise to convulsions of the limbs, and sometimes of the face, particularly if the inflammation be situated near the base of the brain. In thirty cases of convulsions in new-born children, I have found in twenty cases a well-marked inflammation of the meninges of the spine, and in these twenty cases there were six with inflammation of the meninges of the brain and of the spinal marrow; so that it is probable that convulsions of infants are almost always the result of an irritation or inflammation of the rachidian meninges. The following case exhibits the development and the progress of the symptoms of meningitis.

CASE LXXXII.—Louis Russel, aged three days, entered the infirmary on the 3d of September. During the preceding night he had been attacked with convulsions, which continued until morning. His limbs were rigid and violently bent; the muscles of the face were in a continual state of contraction; the pulse was full, strong, and frequent. (*Two leeches to the mastoidean region, sweetened decoction of linden, sinapisms to the feet.*) The convulsions diminished, without ceasing altogether, immediately after the application of the leeches. The child was very feeble, and respired with difficulty, and discharged a quantity of frothy saliva from the mouth. (*Sweetened barley-water, cataplasm to the feet.*) On the morning of the fourth, the convulsions returned with increased intensity; the pulse was quickened, the integuments very hot. The feeble condition of the child forbade the application of leeches, and the treatment was confined to the application of cold to the head. The convulsions continued during the whole day; the body remained rigid, and the vertebral column, which the weight of the trunk will cause to bend with the greatest ease in a young infant, remained straight and immoveable whenever the child was raised. The cry was very acute; the muscles of the face contracted with the same force as before, and they appeared a little more drawn to the left side. In the evening, the child sunk, became cold, with a small, intermittent pulse, and died during the night.

Post mortem examination.—General paleness of the teguments,

spotted redness of the stomach, discoloration of the mucous membrane of the small intestines, tumefied and red follicles in the large intestines. A large quantity of effused blood appeared on the surface of the right hemisphere of the brain, and a sanguineous serosity in the lateral ventricles at the base of the cranium. The meninges of the brain were pale, those of the spine very much injected, and on the surface of the tunica arachnoidea appeared a very thick, pellucid exudation; this coating was very easily raised, leaving the membrane beneath covered with red points, without any alteration of tissue.

Such are the symptoms and lesions usually presented by spinal meningitis. Yet it is possible that there may exist simple irritation without exhibiting, on opening the body, any apparent inflammatory lesions. It is not unusual to find after convulsions in children nothing more, as in adults, than simple injection of the meninges; but ought we doubt that this is the seat of the disease; and do we not see that there is in this case only a difference in degree from the slightest irritation to the highest stage of inflammation, the progress of which generally leads to lesions, which afford incontestible proof of the nature of the disease?

The spinal meninges may participate in the inflammation of all the serous membranes. I once found, in a child that died three days after birth, peritonitis, pleuritis, and rachidian meningitis.

Inflammation of the meninges almost always gives rise, even in very young infants, to an elevation and frequency of the pulse; febrile reaction is more evident in these affections than in phlegmasiæ of the thorax or abdomen; yet I have sometimes found the pulse slow and depressed; but when this is the case, the physiognomy of the child always expresses great pain and anxiety. There also exists at times a very laborious respiration, as is shown by lividity of the face and limbs, and by the slow dilatation of the thoracic parietes.

§ II. *Cerebral meningitis*.—The symptoms of arachnitis of the brain differ but little from those of inflammation of the rachidian meninges. It is much more common at the base than at the upper part of this organ, and the only alteration which is found in children that die from this phlegmasia often consists of no-

thing more than a pellicular exudation, more or less thick, applied in irregular layers on the surface of the arachnoid membrane, corresponding with the base of the cranium. These concretions are almost always found beneath the tunica arachnoidea and pia mater.

One of the most immediate effects of cerebral meningitis is the effusion of serosity in the ventricles. This effusion, designated by authors under the name of hydrocephalus acutus, often takes place before the formation of pellicular concretions, and even when the inflammation of the membrane exists, still under the form of a simple injection; so that many authors, attaching more importance to the symptom than to the cause producing it, have confined themselves to describing, under the title of hydrocephalus acutus, this form or variety of rachidian phlegmasia; but the interesting works of MM. Brichteau, Guersnet, Senn, Gœlis, and others, have demonstrated very clearly the perfect coincidence existing between arachnitis and hydrocephalus; and on this account it appears to me proper to consider the disease in this place, instead of making it the subject of another chapter.

The effusion of serosity in the ventricles of the brain occurs very quickly in infants. The slightest meningeal or cerebral irritation will effect it, and as the sudden presence of this water in the ventricles produces, either by its contact or by the pressure and distension which it creates, a greater degree of pain and a new train of symptoms, meningitis, or encephalitis complicated with hydrocephalus, then assumes its peculiar character.

Indeed, to the restlessness and convulsions which appear at the commencement of this disease, follows suddenly the greatest excitement; the child by its acute cries expresses the violence of its pain, which for a moment ceases, to be renewed with increased intensity. This remission in the symptoms is very remarkable; it sometimes observes a periodical return, and it is this, without doubt, that has induced some authors to describe the hydrocephalic fever as intermittent. But this remission is common to all excessively painful diseases, and especially to such as produce some lesions of the nervous system; this is a fact worthy of observation, and which deserves consideration in the history of every periodical irritation. When the effusion is

considerable, the convulsions are less ; the limbs, which were very remarkable for their spasmodic rigidity, become completely flexible ; the face assumes a peculiar expression, arising from the permanent dilatation of the pupils, and the fixed dull stare of the child ; the pulse, which was remarkable for its frequency and quickness, becomes very slow, and is scarcely perceptible. Yet the child will sometimes of a sudden come out of this state of prostration, and a new state of excitement shows itself ; the limbs are convulsed anew, the globe of the eye becomes the seat of spasmodic movements ; but this exacerbation is of short duration, and is soon replaced by a state of coma, which usually continues until death. Children a little older than those whose pathology I am considering, exhibit other symptoms deserving the attention of the physician ; such especially is the pain in the head, which gives to the child the sensation of something separating the bones of the cranium, an expression which I have heard a child of six years of age use, and in order to convey some idea of the suffering, compared it to that which might be produced by driving a wedge violently in the head, to separate it in different directions.

The secondary symptoms, or those which do not depend directly on acute hydrocephalus in young infants, are vomiting, difficulty of respiration, and angina, with alteration of the tone of the cry. This last affection doubtless arises from the violence and frequency of the cries. There often exists, also, an obstinate constipation.

Sometimes hydrocephalus becomes chronic, after having presented the usual symptoms of the acute form of the disease. The patient then falls into a state of stupor and idiocy, which continues during the remainder of life.

The anatomical lesions which appear on examining the body are numerous and variable. In a few of the cases, nothing is found but a simple vascular injection of the meninges, together with more or less clear serosity in the ventricles. Ought this to be considered as hydrocephalus without meningitis ? I think it ought not ; inflammation does not always cause the pathological alterations which characterize it from the first period of its existence ; we can see every day meningitis and encephalitis characterized, during life, by the most marked symptoms, without of

fering any appreciable lesion on an anatomical examination after death. I have already observed above, that the only conclusion that can be drawn from this apparently negative fact is, that the inflammation had not had time to produce all the anatomical alterations which is usual; one only of these results exists, that of the effusion of serosity.

This effusion varies with respect to its quantity and its seat. Its quantity cannot be appreciated, and it cannot be told to what degree it begins to cause distention or painful compression of the brain; its seat is usually in the cerebral ventricles or in the great arachnoid cavity; it has, however, been found often infiltrated under the pia mater, or even between this membrane and the tunica arachnoidea. Its color varies from a clear to a turbid yellow; it is sometimes mixed with albuminous flakes, sometimes of a gelatinous form, between the circumvolutions of the brain, and is very often sanguinolent at the time of birth. When hydrocephalus has been considerable, the parietes of the lateral ventricles are soft, and are sometimes reduced to a pulp; an alteration which is doubtless the mechanical effect of the distention and compression caused by the fluid, to which, on this account, irritating properties were formerly attributed; but chemical analysis has proved this opinion to be incorrect, and demonstrated that the fluid of hydrocephalus contains nothing that will corrode the substance of the brain. The latter is often very much injected and of a very firm consistence, and I have found, in one instance, small bloody effusions throughout the two hemispheres. Sometimes it is, on the contrary, pale and in a state approximating to softening, or completely softened. The pia mater is always strongly injected, and on its surface, as well on that of the tunica arachnoidea, there is found a layer of albuminous concretions. The plexus choroides, which are almost always of a dark red, are, in some instances, enveloped in a thick coating of albuminiform concretions. Lastly, meningitis may cause, besides an effusion of serosity in the ventricles, a true suppuration on the surface of the brain. The following case, in illustration of this, is taken from Abercrombie, and is one of considerable interest.

CASE LXXXIII.—A child, aged five months, who had previously enjoyed perfect health, was taken with convulsions on the morning

of the 21st of November, 1817. The attack, which was of short duration, was attributed to dentition; the gums were cut at the place where the teeth appeared to produce the irritation, and the usual remedies in such cases were employed. The child continued better during the night; but on the morning of the twenty-second he appeared oppressed with frequent respiration. In the evening he became comatose, without any return of the convulsions. This state continued for some hours, and yielded to local bleeding, active purges, and refrigerating applications to the head. On the twenty-third he was evidently better, with a natural expression of the face. On the twenty-fourth, the same remission of symptoms; but in the evening there was a return of the convulsions, which continued all night; death took place in the morning.

Between the tunica arachnoidea and pia mater there was found a pseudo-membranous production, which spread over almost the entire surface of the brain. The ventricles contained a purulent matter, and the cerebral substance was softened in the neighborhood of their parietes; there was found no serous effusion; there existed a gelatinous concretion below the optic nerves, and also at the base of the brain and cerebellum; a similar substance, mixed with pus, also existed below the medulla oblongata.

The same author reports the case of a child aged eight months, who died on the 13th of March, 1818, after having suffered from convulsions, which were followed by coma. In the course of the disease there appeared a tumor at the anterior fontanelle; it soon assumed a considerable size, and, at the end of three weeks, formed a soft, fluctuating, circumscribed eminence. When it was compressed, it produced convulsions; a small opening was made in it, from which flowed a puriform matter, afterwards bloody serum. This did not produce any alteration of the symptoms, which continued until death. On examining the body, the opening made in the fontanelle was found closed by a thick layer of puriform matter, which extended between the dura mater and tunica arachnoidea to a considerable distance; it was also found between the pia mater and tunica arachnoidea.*

From these considerations, it follows that meningitis appears in two stages or varieties. 1st, It is simple, consisting of nothing

* Pathological and Practical Researches on the Diseases of the Brain, etc. Edinb. 1829.

more than a vascular injection or a spotted redness, with or without the formation of pellicular layers on the surface of the brain ; and in this case it gives rise to general convulsions, spasmodic agitation of the muscles of the face, and to violent cries, which are doubtless produced by extreme pain attending it. 2dly, It may be accompanied with a serous or sero-purulent effusion in the cerebral cavity, and then the restlessness and convulsions are redoubled, to give place, very soon, to a state of coma more or less profound, accompanied with a permanent dilatation of the pupils, rigidity of the limbs, soon followed by their flexibility ; a destruction of the intellectual faculties succeeds, if the child be of sufficient age to have them developed. These symptoms vary much with respect to their duration, intensity, remissions, and exacerbations ; sometimes they are to be seen on one side of the body, sometimes on both sides at once ; but whatsoever be their varieties of form, their fundamental character always exists, and the practitioner ought to be able to distinguish them in the midst of the epiphenomena which meningitis is constantly exhibiting, and which make this disease one of the most serious and insidious which can attack a young infant. Indeed the irregularity in the duration and character of the symptoms, the sudden transition from the exacerbations to the remissions, the numerous complications, rapid progress of the disease, all tend to deceive the physician, and to prevent a proper diagnosis, or to render the treatment unavailing. Let us add to this, that sometimes the most serious symptoms accompany a very circumscribed meningitis, whilst at other times the anatomical lesions exist to a great extent without producing any well-marked symptom, and we can readily conceive the difficulty of forming a diagnosis, and of treating this disease.

There are cases where effusion of serosity appears to be very sudden, causing the immediate death of the patient. This variety has been denominated apoplexia hydrocephalica. But is effusion sudden ? May it not occur slowly, not producing any effect until it has become abundant ? Do we not also see that remissions for a greater or less time may be followed by sudden and unexpected exacerbations ? On this account, I think that this variety requires to be studied with more attention than has heretofore been the case. As to hydrocephalus, which appears to exist

without inflammation, and which may be compared to ascitic dropsy, it must be placed in the class of chronic hydrocephalus, to be hereafter mentioned.

The treatment of meningitis ought to be very decisive. We should apply, early in the disease, two, four, or six leeches at the base of the maxilla; the application of refrigerant compresses to the head, the administration of calomel or other purgatives, and finally the application of several blisters to the legs or arms, should form the base of the treatment. Gœlis especially recommends mercury in the second period of the disease. He gives it in doses of half or a quarter of a grain twice a day until it produces a purgative effect. I have seen the application of a large blister either to the neck or thighs followed with success.

§ III. INFLAMMATION OF THE SPINAL MARROW AND BRAIN.—Inflammation of the spinal marrow, in infants at the breast, is less frequent than that of its membranes. Yet when the latter are inflamed, the spinal marrow becomes the seat of some alterations, which doubtless must be attributed to inflammation. These alterations are not constant; sometimes the medulla is excessively hard, at other times very soft. The first mentioned alteration is the result of recent inflammation; for I have found it frequently in cases where meningitis had made but little progress. I once found this induration so great that I raised with the medulla, deprived of its membranes, a substance which weighed nearly a pound. The child had been affected with convulsions of its limbs, and the meninges were found covered with a thick layer of pseudo-membranous concretions. In these cases of induration, the central substance is more or less soft, and of a dark color; it did not partake of the hardness of the medullary substance.

The softening of the spinal marrow may be either general or partial. It is white, or mixed with a sanguineous effusion.

General softening coexists with a similar state of the brain. The pulp of the medulla is then very soft, yellow, sometimes bloody, or mixed with streaks of blood. The more or less perfect softening, of which I have spoken when considering its passive congestions of the brain, is also found in the spinal marrow, but is of much less frequency; this affection of the medulla rarely exists independently of that of the brain; it is much more

common to meet with that of the brain without the softening of the medulla: lastly, in thirty cases of softening with disorganization of the cerebral pulp, I found but ten where the softening existed at the same time in the brain and spinal marrow. The softening of the medulla presents the same characters as that of the brain; it diffuses also a very evident odor of sulphuretted hydrogen, indicating an advanced state of decomposition; it is easily torn when touched, and the slightest washing reduces it to a soft mass. When this change is found, the child generally has lived but a few days, respiring with pain, and with a smothered cry; its motions are almost nothing, the limbs being in a state of flaccidity; integuments purple, face immoveable. This general sinking or depression is to be remarked in the most robust as well as the feeblest of children. It would appear that the circulation undergoes a great disturbance, for the pulse and beatings of the heart, constantly irregular, are scarcely perceptible. Congestions of blood in the lungs, effusion of blood in the abdomen, cranium, or spine, are usually found. In general, disorganization of the brain gives rise to fewer functional disorders than when the whole cerebro-spinal axis is diseased; this softening appears always to spread from the brain to the medulla, and the symptoms are more evident as the disorganization of the medulla is more advanced. I have frequently met with the brain in young infants entirely destroyed, without any external sign giving evidence of its existence, whilst I never saw the same in softening of the medulla.

The medulla spinalis is found more or less soft, without our being able to affirm that it is diseased, for it is not easy to indicate the degree of alteration when its pathological condition begins; yet the two extremes of softness and hardness may be safely referred to a morbid state of the parts, since I have never met with them, at least in young infants, without the existence during life of some symptoms resulting from these lesions. It can be laid down as a general principle, that extreme softness is always attended with a general paralysis or loss of sensibility; and when the consistence of the nervous tissue is increased, there are either convulsions or an exaltation of sensibility.

A partial softening of the medulla is often met with, that is to say, in one half or one third of its length, whilst the remainder

retains its natural consistence. This softness usually exists at the upper third, and always decreases towards the inferior extremity. We may also find an induration to a limited extent; thus the portion in the lumbar region is often remarkable for its hardness, whilst the rest of the medulla is reduced almost to a soft mass. I have not observed any peculiar symptom which corresponds with this modification of the medullary tissue, and I do not know to what cause to attribute it.* The softening of the lower third is also met with, whilst the upper part is of the usual firmness. In a child aged six months, affected with meningitis, and who died in the eighteenth month, I found a very evident softening at the inferior part of the medulla. The lower extremities of this child were paralyzed, so that they could not afford him the least support. I have frequently observed this paralysis in children, at an age when they usually walk. This, I have no doubt, arises from an affection of the spinal marrow, and perhaps from chronic hydrorachis, an opinion which probably would be confirmed by additional anatomical researches.

It is very difficult to ascertain the presence of inflammation of the brain in young infants, besides it is of less frequent occurrence than congestion, of which I have already given the history. Yet when hydrocephalus, accompanied with meningitis, exists, the species of turgescence exhibited by the brain, the substance of which is of a gray ash color and always injected, should, I think, be attributed to inflammation. The brain in this case appears to be closely invested in its membranes, and quickly escapes when they are cut. This state may arise on the one hand from a serous effusion in the cavity of the ventricles, and on the other, from an inflammatory turgescence, as pointed out by MM. Jadelot and Guersnet, and which they have frequently seen in cases of hydrocephalus.

Induration of the cerebral substance is often found without any symptoms indicating its existence during life. Yet I have, in two instances, seen some convulsive movements in the face, where the brain exhibited a very intense redness, with a firm consistence of its tissue. M. Bouillard has given an analogous

* Further details will be found in a work of M. Ollivier. (*Traité de la moelle épinière.*)

case in the Archives générales de médecine. He found in an infant five weeks old, that died after having exhibited a contraction of its limbs and a spasmodic stiffness of the neck, a sanguineous congestion of the encephalon, the substance of which was also firm.*

It is generally very difficult to detect in young infants the existence of encephalitis from the symptoms. There is, however, a distinction founded on facts, which appears conclusive, much insisted upon by M. Lallemand, and which will enable us to make a diagnosis of the seat of the disease. The symptoms of inflammation of the cerebral mass are made known by aberration of the intellectual functions, whilst that of meningitis shows itself by convulsions with or without delirium; but how can the effects and signs of delirium be seen in young infants, whose mental faculties scarcely exist? We have already seen that when there is an almost complete disorganization of the cerebral mass, there will often be no symptom of this lesion, and that the child will perish without giving reason to suspect by any sign that encephalic disorganization was the disease with which it was affected: ought we then to be surprised that encephalitis should exist at this early age without any serious symptoms? Is not this phenomenon, which is peculiar to the age and pathology of young infants, explained by the little importance and use of the cerebral hemispheres, the organization of which is not yet complete? Anencephalous monsters live without being affected with convulsions, as we have already observed.

But it is not so with meningitis. The cerebro-spinal membranes, when but slightly inflamed or irritated, immediately cause convulsions of the face and limbs, more or less strong, tetanic contractions or pains, cries, and restlessness, which physicians ought carefully to consider; for this assemblage of symptoms is almost always a certain indication of meningitis, and the cerebral or medullary substance may participate in the inflammation, or be unaffected by it, without the possibility of distinguishing in which this complication exists from those in which it is not present.

These remarks are applicable to most cases; but it is neces-

* Archives général de médecine, 1828.

sary to add that the rule is not universal or exclusive ; there may be some exceptions, and symptoms of encephalitis may be noticed which, without being so well marked in infants as in adults, may yet be sufficient to excite the attention of the physician.

CASE LXXXIV.—*Gastro-enteritis and encephalo-myelitis.*—Julien Bouvier, aged three days, entered the infirmary on the 28th of September. He was pale, but not thin ; he was affected with spasmodic contractions of the lips and eyelids, especially on the left side. The limbs on both sides were rigid and œdematous ; the cry was acute ; the pulse very slow ; the skin was of the natural temperature. (*Sinapisms to the feet, three leeches to the left side of the head, sweetened tilia infusion.*) On the twenty-ninth, the convulsions continued ; the respiration became frequent ; the child vomited and passed sanguineous matters from the nares ; the epigastrium was slightly tense and painful when pressed, as was evident from the expression of the face ; pulse small and oppressed ; the skin exhibited a universal jaundice. (*Barley-water, syrup of gum, four leeches to the epigastrium, diet.*) On the 1st of October, the pulse had fallen to eighty-eight ; the jaundiced hue in the face was less intense ; the convulsions scarcely perceptible ; but there was an increase of induration or œdema of the limbs. Death took place on the morning of the 2d of October.

Post mortem examination.—The mouth and œsophagus were healthy ; on the surface of the stomach there appeared several red streaks, with ulceration of the follicles ; the mucous membrane of the small intestines was of a dull white, and had begun to soften. This softening was more evident towards the ileo-cæcal region. In the colon there existed an abundance of mucous follicles, which had not ulcerated. The liver was lighter colored than natural ; the bile small in quantity and black ; the lungs were healthy ; the fœtal openings were partially closed ; the cavities of the heart were of equal dimensions ; the brain was yellow, soft, and diffused a slight odor of sulphuretted hydrogen. A sanguineous effusion, with softening of a yellow color, was found in the cerebral substance, at the anterior part of the right hemisphere. This softening bore a great analogy to that described by M. Lallemand, occurring in adults ; its extent was about half an inch. The meninges were gorged with blood. The spinal marrow was very soft and yellow. A considerable sanguineous effusion was found throughout the spine, with a congestion of the spinal meninges, and a serous infiltration with gas between the

pia mater and tunica arachnoidea, at the posterior part of the medulla spinalis.

In this case we see how trifling were the symptoms which accompanied the inflammation, and even the disorganization of the cerebrum. A few convulsive motions of the eyelids or of the ball of the eye, a slight muscular action in the face, are often the only symptoms of encephalitis in young infants. Inflammation of the stomach was here, perhaps, one of the predisposing causes of encephalitis. This complication is not so common as at a more advanced age.*

Let us endeavor now to ascertain the nature and probable seat of the symptoms which it appears natural to refer to the brain.

Convulsions.—Cerebral or spinal meningitis is most frequently the cause of convulsions. If there exist cases where it is difficult, on examining the body, to discover traces of inflammation of the meninges, it is because of the extreme difficulty of distinguishing their passive congestion from phlegmasia, and also, on the other hand, it is easy to conceive that an irritation of the tissue of an organ may arise before the inflammation can manifest itself, at least to a sufficient degree to be evident to our senses. Besides, as it is much more common to find convulsions in infants with meningitis, than to meet with them without this inflammation, analogy might produce the conviction that the convulsions of children, whatever be their form or degree, whether known as spasm, cramps, twitchings, etc., all arise from cerebral or spinal meningitis. This opinion has been fully demonstrated by M. Brachet, of Lyons.†

Tetanus.—I am not in possession of sufficient facts to elucidate the nature of this disease; it occurs much more rarely in our climate than in hot countries, where a large number of children die from it.

I am unable to give any opinion on the different views entertained by authors on the nature of this disease, having seen but two cases of it in young infants; they were both characterized with rigidity of the vertebral column and of the jaw. I found,

* Sablairolles, *Influence des organes digestifs des enfans sur le cerveau*. Paris, 1827.

† Brachet, *Mémoire sur les causes des convulsions chez les enfans*. Paris, 1824.

on dissection, nothing more than an effusion of a quantity of coagulated blood in the spine. This blood was effused between the two laminæ of the tunica arachnoidea, and filled the whole of the medullary canal, from the medulla oblongata to the sacral region. Were the symptoms of tetanus to be ascribed to this hemorrhage of the spine? I am disposed to think they were.

I shall not speak here of delirium, because it can only be observed when the intellectual functions are developed.

The treatment of encephalitis does not differ from that of meningitis, which has already been described. Besides, encephalitis is almost always accompanied by meningitis.

CHAPTER XI.

DISEASES OF THE ORGANS OF LOCOMOTION.

IN a month or six weeks after conception, the limbs appear, under the form of small projections, slightly flattened laterally and inclining towards the trunk. The upper extremities appear first; at two months, the hand and forearm can be distinguished; the leg and foot show themselves at the third or fourth month. When the forearm and leg begin to appear, M. Béclard observes, they are smaller than the hand or foot; and even the thigh and arm are smaller than the leg and forearm. The upper extremities are distinctly divided into two parts at seven weeks, and the lower at eight weeks; the summits enlarge and divide into short fingers and toes, which remain attached by a soft substance until the third month; this substance then gradually disappears, beginning at the extremity. For a long time the superior extremities, which are the first that are formed, continue the largest, but about the fourth month the superior and inferior extremities are about equal.*

Malformations are very numerous; the limbs may be deficient, or they may be supernumerary; they may undergo an arrest in their formation; may become divided, broken, or dislocated during intra-uterine life.

* *Dissertation Inaugurale*, p. 60.

Haller has given a number of instances of absence or plurality of limbs, or of one or more parts of the same member. He has also recorded several cases of supernumerary limbs, implanted in different parts of the body.* Since his time the records of science have contained a great number of analogous facts, the details of which cannot here be given without exceeding our bounds, and, indeed, they do not comport with the nature of this treatise; I must, therefore, refer to works specially devoted to pathological anatomy, for further information on this subject, and will confine myself to the consideration of solutions of continuity, fractures, and dislocations which occur during the continuance of the child within the womb, or which may take place at birth.

It would appear as if gangrene might affect the limbs of a fœtus and produce a separation more or less complete, and the infant be born with a limb divided, with the trace of a cicatrix on the stump. A child was born at the Maternité of Paris with but one arm; the surface of the stump was cicatrized and a bony cylinder found implanted in the placenta, which probably was the other portion of the amputated humerus. Chaussier was of opinion that this member had been separated by a species of sphacelus.† On the 29th of December, 1824, Dr. Atkinson was called to attend a young woman aged twenty years, who had been married in the month of April preceding. I found, says this physician, the membranes still entire; at eleven o'clock they broke, and half an hour after the child was born. I immediately perceived that the left foot was wanting, and that it had been separated from the leg a little below the calf. The amputated surface was cicatrized except at its centre, doubtless from the projection of the bone. The child was living, but expired in about twenty minutes. After the labor had terminated, upon examining the genital organs, I found the foot in the vagina, and immediately removed it. The section was also cicatrized, except at the point where the bone projected. There existed nothing to indicate that any hemorrhage had been produced by the amputation. This foot, which was much smaller than the right, exhibited no mark of putrefaction, and, on comparing it with the

* *Opera minora—De monstribus, (partes deficientes,) t. iii.*

† Discourse delivered in 1812, at the distribution of the prizes at the Maternité.

other, I judged that it had been separated about two months. The mother, during her pregnancy, had not experienced any thing that could explain this lesion, nor of the time at which it occurred.*

The limbs of a fœtus may sometimes be dislocated. Chaussier has observed in a fœtus both thighs, both knees, both feet, and three fingers of the left hand, in this condition. Professor Dupuytren has recently published a very interesting paper upon the spontaneous dislocation of the os femoris, which, in the greatest number of cases, existed on both sides at once, although in some individuals it may occur on one side only. "In twenty cases of this affection which I have seen," says M. Dupuytren, "the luxation existed on one side only, in two or three individuals. I have now under my care a young infant who has a dislocation only on one side, and what renders this case the more curious is, that this child had a sister affected in the same manner, and which, like the other, existed on the right side."† The dislocation is not usually perceived at the time of birth; but it is easily distinguished as the child advances in age. It becomes apparent, observes M. Dupuytren, when the pelvis acquires a greater width, and the child uses longer and more fatiguing exercise. It is then that the want of support of the upper part of the body on the pelvis, and its inclination forward, the hollow-ness of the back, projection of the abdomen, arched movements of the extremities, defect in the flexibility of the head of the femur, its alternate elevation and depression in the external iliac fossa, etc., begin to be very evident.

This dislocation is generally upward and outward, and the head of the bone rests in the external iliac fossa. According to M. Dupuytren, this displacement appears to arise from the habitual position of the legs of the fœtus in the uterus. The thighs are closely flexed on the abdomen, and the head of the bones are continually pressing against the posterior and inferior part of the capsular ligament; this unceasing pressure, although without any effect in well-formed individuals, may produce a dislocation in others whose tissues are less resisting. With this fact before

* *London Medical and Physical Journal*, July, 1825.

† *Répertoire général d'anatomie*, tome v., page 110.

us, we can understand how it happens that the posterior and inferior part of the capsular ligament yields to the pressure, and allows the head of the bone to pass, thus producing a luxation; and its displacement upward and outward is explained by the action of the most powerful muscles surrounding the joint, tending constantly to cause the head of the bone to pass in that direction after its passage from the acetabulum.*

The treatment ought to be commenced as advised by M. Dupuytren, by rest and the use of means to strengthen the soft parts surrounding the articulation, and to prevent the passage of the head of the bone into the iliac fossa. It is very difficult to use these means to children at the breast; but we may at least arrest the too rapid progress of the disease by directing that the child be not made to stand, as is often done, to enable it, as it is said, to acquire strength; for we can easily conceive that the elevation of the head of the femur into the iliac fossa may be facilitated by the weight of the body. I cannot here detail all the important doctrines contained in this treatise, but must be contented to refer the reader to it for perusal.†

Besides luxations, the bones of the fœtus may be affected with solutions of continuity, either from an arrest in the development, or from a fracture analogous to what is seen in adults; the following case will demonstrate the possibility of solutions of continuity from an arrest of development.

CASE LXXXV.—A child, aged two months, died at the Hospice des Enfants Trouvés on the 4th of June, 1826, of acute pneumonia. On examining the body, I perceived that the humerus was moveable at the middle, where there existed a species of false articulation; a close examination of the part enabled me to ascertain that there was a solution of continuity at the centre of the bone, to the extent of about four lines; this space was filled with a cartilaginous substance of some thickness, the exterior of which was in contact with the extremities of the broken bones, in the same manner as the

* *Mémoire sur un déplacement originel and congénital de la tête des fémurs*, par M. Dupuytren.

† The cases and plates published by M. Cruveilhier may be consulted with advantage. They go to prove, according to the opinion of M. Dupuytren, that this deformity, as well as that of club-foot, depends on the situation of the limbs of the fœtus in utero. (See *Anatomie pathologique du corps humain*, etc., 2d number, pl. 2.)

epiphysis of the bones. This humerus was not longer than the one on the opposite side; the space of which I spoke, therefore, was not formed by a substance deposited between the two fragments of bone, but was the rudiments of the bony cartilages, which, by a singular anomaly, had not become ossified.

It is not improbable that children born with a number of fractures, of which Chaussier has given instances, may have been in a condition similar to this infant. I have seen a striking analogy between the engraved representation of the solutions of continuity in the bones of the skeleton, in the work of this learned anatomist, and that which I have recorded. It would seem as if the continuity of the osseous fibres had been interrupted by an arrest of development, and the part appeared as though filled by a number of cartilaginous intersections. All these fragments were applied to each other by points, the reciprocal surfaces of which were rough like the corresponding surface of the sphenoid and the basilar portion of the occipital bone in young children.

Besides this species of solution of continuity, there also occurs in the fœtus real fractures, which, at the period of birth, exhibit the beginning of consolidation. M Devergie reported at the sitting of the Academie Royale de Médecine on the 4th of February, 1825, the case of a woman who, in the sixth month of her pregnancy, struck her abdomen violently against the corner of a table, falling from a high chair. The pain was extremely severe and continued a long time without any thing affording relief. It suddenly disappeared, and at the usual end of the period of gestation she was delivered of a healthy, vigorous child, having a large tumor on the left clavicular region. The child died on the eighth day after birth, and on the examination of the body there was found a fracture of the clavicle, the fragments of which had united by a large and firm callus, forming the tumor above mentioned. Do not the circumstances of this case produce the impression that there was a connection between the violent blow received by the mother two or three weeks before her confinement, and the consolidated fracture of the clavicle?

The following case, taken from a German journal, and copied in the Archives générales de médecine for March, 1828, is analogous to the preceding:

A young woman, aged twenty-five years, of a strong constitution, in the sixth month of her pregnancy, fell on the abdomen; she immediately felt the child move with great force; these movements continued for some time. The period of her confinement arrived, and she was delivered without accident of a very thin and feeble child, giving but few signs of life, and exhibiting on the right leg a transverse wound, nine lines in length. This wound, the lips of which were pale and flaccid, extended from one malleolus to the other, and involved both the skin and subjacent muscles, and was accompanied with a fracture of the tibia. The body of this bone was entirely separated from its lower epiphysis; it projected from the wound, and was without its periosteum, and exhibited a very unhealthy appearance. The reduction was attempted in vain. It was abandoned on account of the edges of the wound becoming sphacelated, and necrosis having made some progress. The sphacelus extended rapidly, and the child died on the thirteenth day. Dr. Carus, to whom we are indebted for this case, regarded it as a new proof that a child may endure a disease for a long time in the uterus, which may, after birth, quickly become mortal.

It is not unusual to see fractures occurring during labor or after birth; they may be known by the same signs which they exhibit in adults, and require the same treatment to preserve them in a proper position while uniting.

Deformities of the joints are not unfrequently observed; the twisting of the feet or hands in a direction opposite to what is natural, is one which often occurs. This distortion takes place principally in the ankle or wrist, which are at this period still cartilaginous. It has been the custom to suffer the child to continue with this deformity until a more advanced age, when measures are taken for its relief; but would it not be much better to attempt at an early period the removal of this distortion, by gentle compression, which, slowly affecting the cartilaginous parts, is more likely to be effectual than when these parts have undergone the processes of ossification?

Such are the general details which I have to offer on the subject of fractures and dislocations of the limbs. The muscles are rarely affected with diseases, in young infants, worthy of the attention of the physician; in a state of health, the muscles of a child

at birth are of a rose color ; they are of a lighter red than those of an adult ; their consistence is firm, and the direction of their fibres is analogous to the general form and function of the particular muscle. Their varieties of aspect are : 1st, extreme paleness ; 2dly, sanguineous congestion. I have several times found ecchymoses in the muscles ; and it is not unusual to meet with several small petechial spots, varying considerably in their form and number ; 3dly, a yellow color ; I have seen this in one instance of jaundice.

CHAPTER XII.

DISEASES OF THE ORGANS OF GENERATION.

I HAVE little to say with respect to these organs. Their malformations, as they occur in male children, have been already in part described, in the article on the diseases of the urinary passages. As to those occurring in females, they produce no morbid symptoms until the period of puberty, when the genital functions are developed, and the catamenia appear. n

The testicles are sometimes found at the abdominal ring, or they may to a greater or less degree have passed it, at the time of birth ; their continuance at this place sometimes gives rise to inflammatory affections, having a resemblance to peritonitis : they will require the application of emollient cataplasms, and the use of simple or mucilaginous bathing. As these organs descend, they become enveloped in the tunica vaginalis. A dropsy of the spermatic cord may be mistaken for a testicle at the abdominal ring ; this affection consists of small globular cysts in the substance of the cord. When the peritoneal membrane, which descends with the testicle in order to form the tunica vaginalis, is not immediately closed above, a quantity of serosity may accumulate in the sac, and thus form congenital hydrocele, which may be recognised by its round shape, fluctuation, and transparency, but more particularly by the facility with

which the fluid passes into the abdomen. Another aqueous tumor of the scrotum, formed by a serous infiltration of the cellular tissue, has been confounded with this species of hydrocele: it is frequently observed in induration or œdema of the cellular tissue. For the treatment of the first mentioned hydrocele, it will be necessary to use compression on the tumor, in order to cause the fluid to flow into the abdomen, and to maintain a moderate pressure by means of an appropriate bandage. With respect to infiltration of the scrotum, the best applications are refrigerants, made either with simple or vegeto-mineral water.

The testicles of an infant at birth are of a pale rose color; their consistence is firm, and their filamentous texture can easily be distinguished. I have sometimes found them ecchymosed and yellow in young subjects that had been affected with jaundice.

The uterus is small in size, and its central cavity is also very narrow. The sides, however, which are usually covered with a mucous internal surface, are not absolutely in contact. In two instances I have seen blood effused and clotted in the cavity of the uterus in two children that died a few days after birth.* The vagina is usually very much developed; it presents a large elongated cavity, covered with a mucous membrane, the secretion from which is very abundant, for there is always found in this part, in young infants, a large quantity of white, adherent mucosity. This secretion, which might be considered as the effect of a diseased condition of the vagina, such as gonorrhœa communicated by the mother to the child, exists in almost all female infants, and appears to be a necessary secretion, judging from the abundance of the discharge.

* It is not unusual to observe red and fluid blood flow continually from the vulva for some days or weeks after birth. From the observations of Dr. Ollivier, of Angers, this discharge, which is somewhat like the catamenia in adult females, continues sometimes a week, fifteen days, or more, without any inconvenience being experienced by the child. It ceases of itself, and requires no other care than is usually necessary for the infant. This sanguineous discharge is unaccompanied by redness, swelling, or any other symptom of irritation in the external parts of generation. The child has no difficulty in urinating, the alvine evacuations are neither more nor less frequent than in the normal state, and the general health of the child undergoes no derangement. It would seem as if nature had anticipated, in some sort, the establishment of the function which is developed and regulated at a later period of life.

The clitoris is large, and is sometimes even of so great a size as to be taken for a penis, and thus confounding the sex at the time of birth. The external labia are very prominent; they become infiltrated, tumefied, and inflamed, with the greatest facility, when constantly covered with the excretions.*

* *Gangrene of the vulva.*—In the article on gangrene of the mouth, (page 192,) it was observed that gangrenous inflammation may be developed in the external and internal parts of generation, with characters closely resembling those which are seen in the parietes of the buccal cavity. The analogous structure of these parts will account for the analogy of their diseases. Gangrene of the vulva has been noticed by Dr. Ollivier, of Angers, under circumstances similar to those which have been pointed out as coincident with gangrene of the mouth, or as preceding and favoring its development; as certain cutaneous phlegmasiæ, variola, or measles. This disease is rare in young infants, and will sometimes occur in such a manner as to render its diagnosis obscure.

The child of Madame —, aged twenty-one months, of a vigorous and robust constitution, had enjoyed the best health, but was observed to carry her hand, from time to time, to the thighs, as if she experienced a slight inconvenience at the orifice of the vulva. The child, however, retained her liveliness and appetite. Her little brother had been affected with measles, which had passed through its stages without any serious consequences. The distress experienced by this child decided us to examine the condition of the affected part, when there was found on the internal surface of the right labium a round superficial ulcer, gray at the bottom, and surrounded by a bright red circle. On the following day measles appeared, when the ulcer, which had the appearance of an aptha, rapidly increased during the course of the two succeeding days; several others precisely similar showed themselves on the internal surface of the left labium, and around the vulva. Their sinuous borders, their grayish aspect, and the absence of any odor or fœtid discharge, imparted to these ulcers a character very closely resembling a primitive venereal affection. Topical emollient applications of every kind produced no arrest in the progress of this inflammation, while the dryness of the diseased surfaces, the hollow excavations extending through the substance of the labium first affected, and the gangrenous odor now apparent, removed all doubts as to the nature of this affection. In the space of twenty-four hours, the whole of the vulva was converted into a black eschar, surrounded by a red livid circle, and its œdematous condition gave a dry and shining appearance to the skin. The measles disappeared at the end of two days.

From the first appearance of this gangrenous inflammation, cerebral disturbance was very evident, and there existed at the same time an intense fever; while the restlessness, cries, convulsive movements, all announced that the progress of the disorganization was accompanied with great pain. There were, however, no alteration of the features; the abdomen was soft and without pain on pressure, and the stools procured by injections were of a soft consistence; urine limpid and small in quantity. The means employed in the treatment, until the termination of the disease, were acidulated drinks, injection of sulphate of quinine, warm baths, lotions, and injections of chloride of lime and of soda, and pledgets of lint saturated with a similar solution. This treatment was unsuccessful, and the child died, after unheard of sufferings, on the twelfth day.

The breasts of young infants are often the seat of a swelling caused by the accumulation of a milky fluid, the quantity of which is often so great as to be thrown out with considerable force when the breasts are pressed. This turgescence, the cause of which it is difficult to explain, gives rise in some cases to inflammation, often followed by an abscess. This fluid is really secreted by the maxillary gland, which is often more completely developed than the salivary gland; but this development, or rather the turgescence, is but transitory.

CHAPTER XIII.

DISEASES OF THE LYMPHATIC SYSTEM.

DISEASES of the lymphatic system are not so common in the first eight or ten months as they are after that period. I will not, therefore, stop to describe them, but will simply remark that

The insidious progress of this disease in the early period of its existence, without doubt, prevented the employment of stimulating topical applications. In cases of this kind, the ulcerations ought to be cauterized, and local measures freely used, in order, if possible, to prevent the extension of the gangrene. The general phenomena are here different from those accompanying gangrene of the mouth; instead of an extreme feebleness of the pulse, discoloration of the skin, hiccup, tympanitis, and diarrhoea, the child continued to have a rosy hue of the skin, a frequent pulse, soft abdomen, and a firm and plump state of the muscles; a difference resulting, in all probability, from the different seat of the affection. In gangrene of the mouth, all the gaseous products of the local disorganization are exhaled at the orifice of the respiratory passages, and perhaps this pulmonary absorption of the putrid emanations of the gangrenous part may be the cause of the symptoms of debility accompanying this disease. Indeed, all the phenomena appear which arise from the injection of putrid matters into the veins. In gangrene of the vulva, nothing of this kind is to be seen; but there are present a constant febrile action, cries, and restlessness; the intensity of which increases with the progress of the disorder; the disorganized part being isolated, and not in the vicinity of the opening to the respiratory organs, the inspired air is not charged with deleterious principles.

Without doubt, the analogy here attempted to be established between these two diseases might be disputed, on the ground of the different state exhibited by a child in these affections; but whatever opinion be adopted, it seems to us rational to attribute the greater rapidity of the approach of death in the one case to the particular seat of the local affection, which thus contributes directly to vitiate the blood, through the medium of respiration.

the lymphatic glands of the mesentery, which so easily become affected with chronic inflammation, and even with tuberculous disorganization, in children above the age of a year, affected with chronic inflammation of the intestines, do not in very young infants become the seat of phlegmasiæ; but the only alteration observed is a slight tumefaction: and when the gland is cut, it is found to be a little more condensed than natural, and of a rose or even deep red color. The changes which age effects in the nutrition and texture of these organs dispose them particularly to chronic phlegmasia, known under the name of tubes mesenterica. It would not therefore be proper to place this disease among those which are peculiar to infants at the breast. I do not say that they are at this period of life exempt from it, but only remark that it is of very rare occurrence. The lymphatic ganglia of the neck and those surrounding the bronchial divisions and root of the lungs are, in young infants, much more frequently inflamed or enlarged than those of the mesentery. The mesenteric ganglia are but slightly developed at this early period of life; but they increase considerably in the course of a year; and it is to be observed that their diseases and alterations become more frequent in proportion as their development acquires a marked predominance in the system.

CHAPTER XIV.

DISEASES OF THE EYES.

ART. 1.—Development and Congenital Malformation.

THE eyes very early exhibit the projections which correspond with the form of this organ, but they are not organized in a manner that will enable them to perform the function of vision until towards the termination of pregnancy; and they undergo successively the changes which insensibly conduct them to perfect organization. The eyelids are joined until the seventh month; and at first the tunica sclerotica is very thin and transparent.

The cornea, which also appears soon, is at first soft and opaque, and does not exhibit the solidity and transparency which belong to it until about six months. At the commencement, it is in contact with the anterior surface of the crystalline lens, from which it is only separated when the aqueous humor is secreted. The iris is closed, until about the seventh month, by the pupillary membrane, which then separates in the middle and retracts towards the circumference, from the disposition of its vessels; their situation is well described by M. Cloquet. At the time the pupil opens, the aqueous humor which was situated behind the iris interposes itself between the cornea and the iris, and thus forms the space which constitutes the anterior chamber. The vitreous humor, which at first is red, gradually loses this hue, and assumes its proper transparency. The crystalline lens, consisting originally of a fluid, enclosed in a sort of thin cyst, thickens by degrees, preserving still its transparency, and takes a lenticular form.

The continuance of the closure of the eyelids constitutes a malformation which it is necessary to relieve immediately, by dividing them along the line where the borders of the eyelids are in contact.

Congenital cataract and imperforation of the iris require surgical operations, which it is safer to defer to a later period of life. For the further consideration of this subject, I must refer to the various works devoted to surgical operations, where will also be found, in detail, descriptions of congenital cataract.

Malformations of the globe of the eye, its greater or less projection, its minuteness, compression, union with that on the opposite side, or its blending into one eye on the median line, an anomaly known by the name of cyclopia or monopsia, are usually the result of malformation of the orbits, which are found compressed, deformed, or united into one, with malformations of the bones of the cranium or nasal fossæ.

At the time of birth, all the parts constituting the eye are sufficiently perfect for the purpose of vision, but the imperfection of this sense undoubtedly arises from the imperfect organization of the brain. As the latter becomes more completely organized, the sight improves; the axis of the eyes, at first indeterminate, is fixed on surrounding objects, but the attention of the child is

more especially directed to those of a brilliant nature; and we should consequently avoid placing the light in such a situation as will cause its rays to strike the eyes obliquely, and thus force the child to make the axis of vision to depart from its natural direction. The habit acquired at this time may continue during the whole life, and produce strabismus.

ART. 2.—Ophthalmia of Infants.

It is sometimes very difficult to account for ophthalmia in infants; yet the length and difficulty of the labor, and the consequent compression of the head, may be regarded as a cause of this affection. Mothers who have gonorrhœa may communicate purulent ophthalmia to their children; yet as there are numbers of children that have ophthalmia, born of mothers who have not been affected with any kind of syphilitic disease, gonorrhœa ought not to be considered as its sole cause. It would seem that the accumulation of a number of children in a hospital disposes them to this disease, for it always prevails to a greater extent among children in hospitals than in large cities. Badly sheltered habitations, an atmosphere filled with smoke, little attention bestowed on the child in neglecting to wash the eyes upon the appearance of any redness in them, are evident causes of the development of the disease. Dr. Heurteloup has truly observed, that the frequency of this disease in the Hospice des Enfants Trouvés may arise from the number of children crowded in badly-aired wards.*

It appears in two distinct stages: once developed, it produces a number of alterations in the appendages of the eye; and it may indeed successively destroy every part of the organ of vision.

At the commencement of the first stage, the eyelids are slightly red and tumefied, and nothing more is seen than a red transverse line in the centre of the eyelid. The child cannot bear the light, but turns its head in an opposite direction whenever the candle or other shining object is brought before it, and also cries when the eyelids are touched. Pain or itching will sometimes

* *Inflammation de la membrane muq. gastro-pulm. chez les nouveau-nés.* Paris, 1823. p. 16.

excite continual crying, and deprive it of sleep. The edges of the eyelids, particularly at the internal angle, then begin to appear red; and if the internal surface be examined, it will be found to be either of a deep red, or considerably injected with blood. The globe of the eye exhibits no change. This is the first stage of infantile ophthalmia; it occurs on the third, fourth, or sixth day after birth, and will continue a very little time in the same condition, if left to itself.

The second stage is known by the formation of pus; all the preceding symptoms are increased in intensity; the injection of the bloodvessels is extended to the globe of the eye; the redness exteriorly is greater; a large quantity of pus is discharged, and causes the edges of the eyelids to adhere, and the pus accumulates in the sac thus formed, and when the lids are separated pus immediately flows out; the child is unable to open the eyes, both on account of swelling and the impossibility of bearing the light. The conjunctiva, which is also inflamed in this stage of the disease, becomes of a deep red; the folds of this membrane, which exist between the globe and the eyelid, swell, and are covered with a number of very small granulations; and as these folds compress and force out the tarsal cartilages, they thereby cause an inversion of the eyelids to a greater or less extent whenever the child cries: two red fungous rings are observed between the eyelids. While the inflammation increases, the supuration becomes more abundant; it varies much as to its color and consistence: it is usually thick and of a light yellow, and sometimes mixed with blood, occasionally in large quantities. In an advanced stage of the disease it assumes a green color; and I have also seen it, in children affected with jaundice, of a deep yellow.

I remarked that the inflammation passed from the eyelids to the globe of the eye. When it affects the latter it produces some very serious lesions, which sometimes terminate in the total loss of sight, even in the youngest infants. Let us take a rapid view of these complications.

Inflammation of the cornea, or keratitis, is the most common ;*

* Mirault, *Dissertation inaugurale sur la k ratite, ou inflammation de la corn e*. Paris, 1823.

and several kinds of lesions are its effects, such as its opacity, softening, ulceration, and perforation.

Opacity, as in adults, arises in consequence of an effusion of puriform matter between the laminæ of the cornea, or in the substance of the conjunctiva, which covers the globe of the eye. It spreads to a greater or less extent, and I consider it as the least serious effect of puriform ophthalmia, as it usually disappears upon the yielding of the inflammation.

Softening is not of unfrequent occurrence, and is a much more serious termination. When it commences, the cornea loses its lustre, and exhibits at one or several points a grayish or brown tint, and the line of demarcation which separates the healthy part from the diseased portion may easily be distinguished. The centre of this softening soon becomes perforated, and a communication is established between the external air and the anterior chamber of the eye, so that, as soon as the perforation is complete, there flows out a certain quantity of aqueous humor. This opening appears even at the centre of the globe of the eye that is opposite the pupil. It may be of sufficient size to allow of the escape of the crystalline lens with the aqueous humor, and which is followed by some of the vitreous humor. The globe of the eye shrinks, the eyelids, on healing, close, and vision is completely lost. I have, in several instances, seen the iris project beyond the borders of the opening, and partially obliterate it, and thus prevent the flowing of any more of the humors of the eye.

Ulceration differs in some respects from softening; it usually occurs at the opaque parts of the cornea; the edges are tumefied, and it consists of small solutions of continuity, the sides of which are a little prominent, more round and regular than in softening. The same effects follow both these varieties of the disease.

When the inflammation diminishes, the swelling of the eyelids gradually ceases. Suppuration is less abundant, and less green, and thinner. The child is better able to bear the light, and can open the eyelids with much more facility; but the lesions with which the membranes were affected continue, and children with this derangement of parts may become either partially or totally blind, from the continuance of the opacity of the cornea, staphyloma, or the complete evacuation of the aqueous humor and crystalline lens. The pupils remain more or less deformed, according to the

adhesions they have contracted with some of the surrounding parts. As a general rule, the prognosis of ophthalmia of infants is unfavorable in proportion as the globe of the eye is involved in the inflammation, and as the constituent parts of this organ are altered. The continuance of this inflammation is very variable. When it is simple, it lasts but for a few days; when complicated, with organic alterations of the globe of the eye, it may continue for several weeks or months.

Opacity and softening of the cornea are not always produced by puriform ophthalmia alone. I have seen several children, who had been reduced to complete marasmus by gastro intestinal disorders of long duration, affected, without palpebral inflammation, with softening of the cornea, which was followed by a perforation and a discharge of the humors of the eye and the crystalline lens. This species of spontaneous softening reminds me of the fact noticed by M. Magendie in a dog, which, being fed for a long time with sugar, died after having been reduced to great emaciation. "There appeared," says M. Magendie, "on one eye, and afterwards on the other, a small ulcer on the centre of the transparent cornea; it rapidly increased in size, and at the end of a few days it was about a line in diameter, and its depth increased in the same proportion; the cornea was soon perforated, and the humors of the eye escaped. This singular phenomenon was accompanied with an abundant secretion from the glands of the eyelids."* Was defect in alimentation a cause of the softening of the cornea?

The first object to be considered in the treatment of this disease is the relieving of the inflammation. It has been recommended for this purpose to apply leeches to the middle of the upper eyelid. One, however, is sufficient; Mr. Lawrence observes that a larger number produces the discharge of too large a quantity of blood, and that the most robust infant is reduced, even by the use of one single leech, to a state of debility and paleness.† M. Baron usually applies one leech to the external angle of each eye, and I have seen the most happy effects result from this method even while the eyelids were very much tumefied. At the same time the eyes ought to be washed with a collyrium, made

* *Précis élémentaire de physiologie*, t. ii., p. 203.

† *Practical Treatise on Diseases of the Eyes*.

with a decoction of marshmallows or of rosewater. It is the practice in the children's hospital at Vienna, to have compresses saturated with cold water kept continually applied to the eyes. The edges of the eyelids should also be frequently anointed with some mild ointment, to prevent their adhering, or to promote their separation when they have become united.

Mr. Lawrence advises, immediately on the removal of the inflammatory symptoms, the use of astringent collyria. A wash, consisting of two, three, or four grains of alum in an ounce of water, is usually employed for this purpose at the ophthalmic infirmary. This solution should be carefully injected between the eyelids, three or four times in twenty-four hours, so as to remove entirely all the pus. In some cases, and where the conjunctiva has not become inflamed, astringents may be employed from the commencement. All that is done at the infirmary in London is to wash the eyes with a solution of alum, and to give a little magnesia—a course of treatment which has been very successful. A solution of the nitrate of silver may also be advantageously used, in the proportion of one or two grains to an ounce of water, and increasing it to six grains to the ounce.

CHAPTER XV.

JAUNDICE OF INFANTS.

JAUNDICE is a yellow coloring of the integuments, or of the proper tissue of one or more of the organs. This definition embraces all the varieties of form, aspect, and extent of jaundice, but this denomination is not applicable to every case of yellow coloring of the skin: we shall presently see that it may be observed in many parts of the body; that it may be general or local, and exhibit various shades of color in different subjects.

I have remarked the yellow coloring which constitutes jaundice, in four instances, in the brain and spinal marrow; the brain, which was of moderate firmness, presented a uniform and bright yellow in two of these subjects, while the color was in isolated patches in the other two. In three of these cases the substance

of the medulla was of a deep yellow, and its consistence very soft; and in the two subjects where the yellow color of the brain was uniform, there existed, at the same time, a general jaundiced affection of the skin. This yellow coloring is analogous to that which M. Lobstein has observed in an embryo, and which he has named *kirronosis*.

I have never seen it in the lungs, but have only found them infiltrated with a large quantity of yellow serosity; the tissue of the heart, however, and the pericardium, are sometimes of a deep saffron color. The thymus gland also is colored to a greater or less degree. The intestinal tube, which very often has, at its internal surface, a yellow color, owing to the contact of bile, in two instances which I have examined, exhibited a yellow coloring, both on the internal and external surfaces, and which also appeared on the mesentery and on the external layer of the peritoneum. I dissected and preserved a portion of this intestinal tube, and observed no change in the color. I have already spoken of the yellow color which exists in streaks on the kidneys; even the bladder is sometimes of the same color on its internal surface. The liver is very often yellow in young infants, and I have even on some occasions found it deeply colored, in subjects where there existed but little of the jaundice exteriorly; this, however, is very rarely observed. The muscles are also colored yellow, but the cellular tissue, and adipose substance surrounding them, are perfectly white. At other times, the whole adipose system is yellow, while neither the integuments, muscles, nor any of the organs exhibit this color. I have, in two instances, especially noticed this in young infants, and when the thigh was cut transversely the stump appeared yellow in circular line beneath the skin, while neither the skin nor the muscles presented any thing of this color. I have also found the periosteum and the osseous tissue possessing this tint, with or without a general affection of a similar nature.

The external integuments are the most ordinary seat of this disease. Their color varies from a light to a greenish yellow; and it is sometimes confined to the face, and sometimes to the limbs and trunk; it spreads successively from one of these parts to another, or makes its appearance in some point after having disappeared at another. In the cutaneous affection, the conjunc-

tiva is also very often yellow; but this coincidence is much less frequent in children than in adults. It is very common to find the serosity of the cellular tissue of the pleura and pericardium, and also of the peritoneum, tinged with yellow. The color of the urine and *foecal* matter varies considerably; the pus secreted from inflamed organs is often of the same hue; the serum of the blood is almost always yellow.

In eighty cases of jaundice, I found in fifty the liver and the abdominal vessels engorged with blood, and I have recorded forty cases of hepatic congestion without jaundice. In the eighty cases just mentioned, I found the bile more yellow and more abundant than ordinary in only two. I have remarked that icterous affection of the skin follows the red color, so common in infants, and always in a gradual manner. While the skin of the child is still very red, there is to be seen a yellow shade, and if the finger be applied so as to make a little pressure, instead of becoming white it exhibits a yellow tinge, and returns to the red color when the pressure is withdrawn: the jaundice becomes slowly more evident, and about the third, fourth, or eighth day, it takes the place of the red, and is in its turn replaced by the white, or delicate rose color peculiar to the skin of young infants: it would appear, then, that jaundice was a shade or intermediate color between the tegumentary congestion of new-born children, and the proper white color of their integuments.

From this exposition of facts, it results, 1st, That jaundice, being sometimes local, cannot arise from a general cause, which would extend its morbid influence over every part of the body, as diseases of the liver, for example, to which it has been usual to attribute it; and M. Lobstein has remarked, besides, that the medulla spinalis is sometimes colored yellow, at a period anterior to the secretion of bile. 2dly, The liver and the bile are found to be in cases of jaundice in very variable conditions, and it would be difficult to explain what would be the pathological state of this organ, or of its secretion, to produce the disease in question. 3dly, Notwithstanding the sanguineous congestion of the liver and integuments coexisting with jaundice in the greatest number of instances, it is probable that the retention of this fluid in the organs, and the deposition of serum, which is

almost always yellow, is the cause of jaundice; a color owing either to the coloring principle of the bile, as appears to be proved from the experiments of M. Chevreul, or to a source still unknown.

In every instance, the jaundice of infants cannot be considered as a disease; it may safely be left to nature, and it will of itself disappear; the use of medicine is unnecessary, unless there should arise some affection of the cerebral, thoracic, or abdominal organs.

The English pathologists, Armstrong, Underwood, together with Dr. Dewees and others, have made a distinction between jaundice of new-born children, and that which is symptomatic of affections of the liver: they have founded this distinction on the appearance of the alvine evacuations, which in the latter disease are white or yellowish; the tears also and other secretions are tinged of the same color. These symptoms, however, indicate nothing more than a greater degree of ordinary jaundice, but do not establish a sufficient difference in the disease to warrant the employment of any additional therapeutic means.

CHAPTER XVI.

ACCIDENTAL TISSUES IN INFANTS.

ACCIDENTAL tissues are not of very common occurrence in young infants; for they appear to be produced by the organic modifications occurring in the organs during their growth in the course of life. I have found but two kinds of accidental tissues in the great number of bodies that I examined in the year 1826. These were scirrhus and tuberculous.

One of these cases, that of scirrhus, occurred in an organ where it is seldom or ever found in an adult,—that of the heart. The following is the history of this curious fact.

CASE LXXXVI.—*Scirrhus of the heart*.—Courtini, aged three days, was brought to the Hospice des Enfants Trouvés on the 4th of November, 1826, and died the next day. The post mortem ex-

amination was made twenty-four hours after death; externally, the body exhibited a considerable embonpoint and the integuments were violet colored. A general passive congestion was found in the intestinal tube. The lungs were healthy; the heart, which was of the usual size, exhibited at its anterior part three white prominences of unequal volume, and flattened anteriorly and very near each other. The largest was near the base of the heart; the one next in size was nearer the summit of the organ, and the smallest between them. They were imbedded in the substance of the left ventricle and of the septum, and projected on the internal surface of the heart. This was very hard when cut, and exhibited fibres crossing each other, the appearance and form of which were analogous to the tissue of scirrhus. When placed in contact with nitric acid, this substance became crisp and black; the same phenomena occurred when placed on live coals, it did not melt like fat. The surrounding tissue of the heart was perfectly healthy; and every thing led to the belief that these tumors were not formed by the adipose tissue. I do not know to what cause to attribute the formation of this tissue in an infant who must have necessarily been born with this disorganization. I was unable to obtain any account of the mother's health.

Tubercles.—There have been several instances reported of the existence of tubercles in various parts of the body of a foetus. I have found tubercular granulations in the peritoneum of a child that died four days after birth; in two still-born children I saw an evident tubercular disease of some of the mesenteric glands. OElher has found the mesenteric glands tumefied, hardened, and in a word scrofulous, not only in children born of scrofulous mothers, but also in those whose mothers exhibited no sign of this disease.* Tubercular granulations of the spleen are not very rare in young infants; I have seen them in five children, where there existed at the same time in two of them tubercles in the lungs. We should be careful not to mistake tumors arising from duplicate monstrosity, in which may be discovered the fragments of a foetus, for an accidental organic transformation.

Tubercles in the lungs have been seen both in stillborn children and those born before the full time. M. Husson reported

* *Art. OEuf. (path.)* Dict. de Médic., t. xv., p. 402.

to the Académie royale de médecine the cases of two children that he dissected, the one born at the seventh month, the other at the full time, and that lived eight days, where the tubercles were found softened, and already in a state of suppuration, in the former case in the lungs, although the mother had not been affected with phthisis, and the latter in the liver.*

During the year 1826, I met with four cases of pulmonary tubercles in infants that died at the age of one, two, and five months. They all at the time of birth exhibited an activity and embonpoint which would not allow of the supposition that there existed the organic alterations with which they were affected. They gradually fell into a state of debility and marasmus; the abdomen became tympanitic, their cry was changed, and in two of them percussion was not followed by the sound which is natural to this age; this circumstance induced the belief that there existed tubercles, which were found in great numbers on a post mortem examination. Neither of these children were affected with the symptoms peculiar to phthisis of adults, such as bronchial catarrh, hæmoptysis, sweating, and coliquative diarrhœa; one only had diarrhœa; the mesenteric glands in this case were found in a tuberculous condition, with follicular ulceration in the intestines; the child thus affected was the one aged five months. One of the others had, for three days, symptoms which appeared to indicate the existence of a severe laryngitis: it died from suffocation. On examining the dead body, the trachea, bronchiæ, and lungs were found in the following condition: the pleura was covered with a large number of small, slightly prominent, white granulations; the larynx and trachea were healthy; the bronchiæ contained, at their commencement, some frothy mucosity; the left bronchia was filled with a thick puriform fluid. There existed at the root of the left lung an irregular tubercular mass still in a crude state, compressing the opposite branch in such a manner as scarcely to permit the air to pass. The internal membrane of this bronchia was red and tumefied at the place of its stricture. The pulmonary tissue was white and flabby, and the bronchial ramifications shrunk. The other lung was quite permeable to the air, and was per-

* *Art. OEuf. (path.)* Dict. de Médec., t. xv., p. 402.

fectly healthy, with the exception of some very small, transparent, tubercular granulations scattered throughout its tissue.

Pulmonary tubercles, for the most part, in those children that I have dissected, appear under the form of small, round, transparent granulations, disseminated on the surface and tissue of the lungs, either at the extreme branches of the bronchiæ, or in the spaces between them; whilst tubercles in a more advanced stage, and even in a state of suppuration, appear at the root of the bronchiæ, or in the trachea. It would seem from this that the tubercular transformation of the lymphatic ganglia, situated at the root of the lungs and in the vicinity of the bronchial ramifications, takes place first, and that a similar transformation afterwards occurs in the lungs; can we not also suppose that, in the beginning, the pulmonary tubercles consist of small granulations, appearing at first transparent and soft, but when increased in number unite, and thus form the tubercular masses which we meet with in the lungs at a more advanced age? This form of pulmonary tubercles, more common than any other at the early period of life, appears to reveal the primitive mode of development of pulmonary tubercles.

CHAPTER XVII.

ALTERATION OF THE BLOOD.

IN the bodies of three stillborn children, that were in a state of general decomposition, and to which I was at a loss to assign a cause, I discovered what appeared to me to be a well-marked alteration in the blood.* The small number of well-ascertained

* In these three cases, it was impossible to ascertain the state of the mothers at the time of labor. There is no doubt that the health of the mothers had a direct influence on that of their children; numerous examples have long since demonstrated this fact, and in the present instances, there is in all probability an analogous coincidence. There is a case recorded in the *Archives gén de méd.*, tom. xv., p. 92, of decomposition of the blood, accompanied with general petechiæ, in a woman that died just before the full time of her pregnancy. The condition of the fœtus was as follows: it was, as usual, covered with a quantity of caseous matter; the epidermis was raised at the feet, hands,

facts published on the alterations of the fluids in diseases, will not permit at present of the establishment of any fixed and positive theory; I will therefore merely point out the facts which I have observed, as a contribution to the history of the diseases of the fluids.

In eight children, who had not lived beyond the eleventh day, and who had sunk under pneumonia and gastro-enteritis, I found a general discoloration of the body, accompanied with complete marasmus, without decomposition of the integuments or destruction of the epidermis. When incisions were made in different parts of the body, there flowed out a large quantity of very fluid chocolate-colored blood; the mucous membrane of the digestive tube exhibited in almost all the cases the discoloration and white softening which I have described in the chapter on diseases of the digestive tube. The liver was gorged with fluid blood, and similar in color to that of the integuments; the lungs were in the same condition, and quite soft; the heart also was pale and flabby, and in the same state of congestion. The fœtal openings were obliterated in almost all; in some the brain was firm and without injection; in the greatest number it was softened, and in two I found it decomposed, and diffusing an odor of sulphuretted hydrogen. In four others, I found the liver also softened, exhibiting the same odor. The bile did not present any thing peculiar. The whole of the tissues were remarkable for their softness, flaccidity, and their near approach to a true decomposition. In several others, the limbs were œdematous, and the skin had the appearance of wax. They had all been affected with an extreme slowness of the circulation, and great prostration; their cries were feeble, and they continued for two or three days in a kind of agony, which death soon terminated, without giving rise to any particular symptom.

and scrotum. There was no ecchymosis on any part of the body. The brain was injected with fluid blood; the lungs, pericardium, heart, and origin of the great vessels, were covered with purple spots of a small size. The liver, spleen, intestinal canal, kidneys, and bladder were in a healthy state.

All the blood that flowed from the cut parts, together with that which was contained in the different vessels, both of the mother and fœtus, was fluid and violet, resembling a mixture of carmine and water. In no part of the body was there found the smallest clot.

Death in these children appeared to be caused more by a kind of spontaneous decomposition of the solids and fluids, than by the progress of any inflammatory disease, or of any organic lesion. Does not this species of death bear some resemblance to the withering and disorganization of vegetables, rather than to those alterations which occur in the organs of a being in possession of all the plenitude of life? And the patient, when sinking under them, manifests symptoms of reaction which may, in a metaphoric sense, be considered as the effect of a kind of struggle between death and life.*

* Although the important remarks of Dr. Joerg, in his work on diseases of children, p. 310, may perhaps have but an indirect reference to the preceding facts, yet from their interesting character we shall place them here. A very important disease of the skin in young infants, says he, is that which is characterized by a peculiar state of the epidermis, which is detached on the slightest touch from the sole of the foot, toes, palm of the hands, fingers, and even sometimes from the entire surface of the body. I have only once seen this general separation of the skin in a child in perfect health, and born at the full time; but have frequently met with it on the hands and feet. In every case the mother had been affected with syphilis during pregnancy. None of the children thus affected lived longer than four or five days, and although born in the ninth month, they were all thin and debilitated. The part deprived of the epidermis became inflamed, and this circumstance, joined to the extreme debility of the individuals, contributed greatly to shorten their lives. I am entirely ignorant of the nature of this disease. This state of the skin on the hands and feet is sometimes accompanied with a pustular eruption on various parts of the body, differing essentially from the small-pox in the form and appearance of the pustules. They bear some resemblance, however, to the pustules of vaccinia on the twelfth or thirteenth day. It has been likewise impossible for me to ascertain any thing satisfactory as to the nature and progress of this eruption, from the extreme rapidity with which all children die that are affected with this singular disease. (*Archives gén de méd.*, tom. xxiii., p. 560.)

A

MEDICO-LEGAL DISSERTATION

ON

VIABILITY,

CONSIDERED WITH REFERENCE TO THE PATHOLOGY OF NEW-BORN CHILDREN.

VIABILITY is the capability of extra-uterine life; it should consist not only in the normal state of the organs of the infant, but likewise in the absence of all physiological and pathological causes, capable of opposing the *establishment* or *prolongation* of independent existence. Thus, as Professor Orfila has observed, an infant may have lived, and yet not have been regarded as viable, because some organic malformation may have prevented the prolongation of life; another child, born living, may perish in the first period of its life, although it was viable.*

The question of viability, then, must be considered with reference to the pathological causes which may be adverse to the establishment of life, and it is therefore necessary to have a proper estimate of these causes. It appears to me useful to ascertain how far congenital malformations and diseases of the new-born child may embarrass the establishment of life, for all congenital diseases are not productive of non-viability; some offer no impediment to the establishment and continuance of independent life, while others clog and embarrass its development; the latter are the inevitable causes of the death of the child, and the study of their nature is the object of this dissertation.

The various apparatuses and principal organs of the system will be reviewed, and the congenital malformations and diseases which may be developed during the evolution of the fœtus ex-

* *Leçons de Médecine Légale*, 2d edit., p. 511.

amined. I shall divide this subject into two parts; the first will comprise the study of congenital diseases, and that of their influence upon the development of life; and the second the application of these data to legal medicine.*

PART FIRST.

ON CONGENITAL MALFORMATIONS AND DISEASES.

§ I. CONGENITAL MALFORMATIONS OF THE SKIN.—Care must be taken not to mistake for a congenital disease the intense redness of the skin of a new-born child, and the epidermic exfoliation which occurs several days after birth; both of these are natural phenomena.

Absence of the skin in one or more parts of the body has been noticed from the highest antiquity, an account of this lesion being found in the writings of Hippocrates, who has made it the subject of some very judicious observations.† This congenital malformation is not adverse to the establishment of life in an infant, except when there coexists some other deformity, or when an organ is exposed which is essential to life. Thus, absence of the skin, with a wound on the limbs or face, is susceptible of cicatrization after birth, and can oppose no obstacle to the execution of the functions of life; but when absence of the skin results from an arrest of the development of the thoracic, abdominal, or cranial parietes, this malformation must be fatal, for important organs are thereby deprived of their integuments, and the child is exposed to the most serious and fatal affections.

Cutaneous excrescences, which are met with on the face, hands, and feet, are not causes of non-viability, at least if unaccompanied with a defective development in some other part; which, however, as Meckel observes, is of common occurrence. Thus,

* The facts which furnish the matter for this dissertation being contained in the numerous cases throughout this work, it is impossible to avoid some repetitions; but on reflection, it will be seen that it was indispensable to recal all the examples which concur in the demonstration of the various points we have undertaken to elucidate.

† *De Geniturâ*, cap. 6.

the cutaneous excrescence which is seen on the forehead of a fœtal cyclops is not a dangerous deformity, except when it co-exists with some other congenital malformation. Those cutaneous excrescences which are met with on the face alone, may be removed and cured without injury to the health of the child.

It is the same with horny excrescences ; but their existence on the human fœtus is scarcely yet proved, and the passage which Haller has devoted to these extraordinary growths has no foundation but in facts very slightly authenticated.

The excessive development of the pilous system at birth, must be considered as an abnormal persistence of the hairs which cover the fœtus about the middle of the intra-uterine life, and which generally fall off before birth. Far from considering these infants as animals deprived of their faculties, and consequently of the rights of civilization, as some ignorant persons have done, according to the account of Haller,* they ought to be examined with care, to see if there exist no other organic aberration or some disease of the internal organs, which are adverse to the establishment of life, for this simple abnormal development of the pilous system cannot be a cause of non-viability. These hairs fall off some time after birth, and the infant then no longer exhibits this superficial and transitory anomaly, which ignorance alone could confound with the integuments of animals.

Alterations in the color of the skin may be referred to petechiæ, albinism, and cyanosis. Albinism can have no influence on viability ; petechiæ and cyanosis, which are frequently seen in infants at birth, are ordinarily the symptoms of affections more or less serious, which doubtless may oppose the establishment of life : but attention must be paid more to these lesions than to the modification of the cutaneous pigment, which is of but little importance when separately considered. As to albinism, it exerts no influence in opposition to the prolongation of life, and albinos have been seen at an advanced age.†

Ecchymoses, sanguineous tumors, contusions of the integuments, which ordinarily result from a local or general sanguineous congestion, ought always to be considered with reference to

* *Opera minora*.—De monstris, lib. i.

† J. Geoffroy-Saint-Hilaire, *Histoire générale et particulière des anomalies de l'organisation dans l'homme et les animaux*. Paris, 1832.

the causes which produce them; of themselves they are of no consequence. The spots and erectile tumors, which are described under the name of *nævi materni*, have no power over the viability of children, because they may live a long time with this deformity, which does not become mortal unless it is of great extent, or makes rapid progress.

Congenital inflammations of the skin deserve the attention of the medical jurist. Infants have been born with measles or smallpox. Examples are given by Bartholin, Boërhaave, Van Swieten, Vogel, Jenner, Mauriceau, MM. Rayer, Dugès, and others. Some of them were feeble and premature, and died a short time after birth. Children have been cured of these affections and lived a long time after. Consequently, if these inflammations of the skin are unaccompanied with any congenital malformation, or any other serious disease, they ought not to be considered as an obstacle to the establishment of independent life.

Induration or œdema of the cellular tissue never exists alone, but is almost always accompanied with a state of congestion of the principal organs, and particularly of the respiratory and circulatory apparatus. This congestion is evidently adverse to the establishment of life, and offers, as we shall see below, a great hindrance to the viability of the child. It is not, therefore, to the œdema alone that we ought to direct our attention, when about to pronounce a judgment on the viability of an infant thus affected, but we ought to ascend to the examination of the accompanying lesions. As to those infants described by Uzembezius, that were born so cold and hard that they might have been mistaken for marble statues, no doubt can exist as to their non-viability, since they are almost always born dead. This kind of induration of the cellular and adipose tissue is generally the effect of decomposition.

§ II. DIGESTIVE APPARATUS.—Absence of the buccal cavity, and also the absence of the anterior opening of the mouth, replaced sometimes only by an irregular orifice, situated at some part of the buccal cavity, ought to be considered as a cause of non-viability; as it is impossible for the child to exercise suction or deglutition, and it is even impossible to introduce drinks into the digestive passages. It is not so, however, with the more or less perfect occlusion of the mouth, in consequence of adhesions

of the lips; this deformity does not necessarily affect the viability; for, by means of an operation, a passage may be established to the digestive organs. But when the absence of the mouth co-exists with a congenital malformation of the face and cranium, this deformity ought to be regarded as a cause of non-viability.

The same may be observed with regard to congenital division of the lips, palatine arch, and velum. The child may live a long time, whether no effort be made to relieve the infirmity, or an operation, which is most frequently successful, be performed for that purpose. A monstrous development of the tongue is not an insurmountable obstacle to the functions of life. In the 15th volume of the *Journal de Médecine de Vandermonde*, is recorded an account of a child born with a tongue of enormous size, the inferior extremity of which adhered to the gums of the lower jaw, by a spongy tumor about the size of a filbert. After a while, this tumor became confounded with the tissue of the tongue, which steadily increased in size as the infant advanced in age. During this time, the child was sustained only by liquid aliments; it had become habituated to the practice of sucking by drawing the lower jaw considerably backward; at last, instructed by its wants, it was enabled to arrange the tongue and jaw so as to chew and articulate sounds. This child, therefore, in spite of this infirmity, was viable, and was much more so because the tongue might have been reduced in size by an operation, and the proper form and use of the organ restored. Children are sometimes born with passive congestions of the mouth and tongue, which can have no influence on the development of life.

The extreme narrowness of the pharynx I have observed to coexist with that of the tongue; it interferes much with deglutition, but cannot be considered as a cause of non-viability.

Congenital malformations of the œsophagus are almost always mortal; one species, that of stricture of the œsophagus, may allow the infant to swallow drinks, although with difficulty; but it is not so with obliteration, fissure, or duplicity of the œsophageal canal. Infants affected with obliteration of the œsophagus may exhibit congenital malformations externally, and which alone would remove all doubts that might be raised upon the medico-legal question of which we are treating; such is the case in the instance given by M. Lallemand, of Montpellier, in his inaugural

dissertation. Dr. Sunderland, of Barmen, has given the history of a child born at the full time, and to appearance in good condition, that died at the end of eight days, after having continually vomited the aliments which had been given. On opening the body, the cardia was found wanting; the stomach adhered at this place to the diaphragm by means of the cellular tissue.* With such a malformation an infant must necessarily perish. The same fatal result will always occur when the œsophageal canal is obstructed, interrupted, has a deviation from its natural direction, or is divided into several parts.

Congenital inflammation of the œsophagus, without completely opposing the viability of the child, may very much disturb the exercise of life, and at last terminate fatally. I have seen, in two infants that died a short time after birth, ulcerations which were doubtless developed in the œsophagus during the latter part of the intra-uterine life, and which, by the progress they made after birth, contributed greatly to hasten the death of these infants. It is possible to meet with a gelatinous softening of the œsophagus in a new-born child; in such an affection the infant vomits all that is given to it, and becomes rapidly emaciated from default in nutrition; and as the progress of the disorganization is continually increasing, perforations of the œsophagus are found upon examining the body after death. The gelatinous softening being a disorganization of tissue, and this disorganization having commenced or terminated before birth, cannot be cured and cicatrized. I am therefore of opinion that it ought to be regarded as an inevitable cause of death; consequently infants that are born thus affected are not viable; the chances of life for them are very uncertain.

The stomach exhibits no anomalies except with reference to its situation and form. Displacement of the stomach offers no obstacle to life; it can discharge its functions when it is situated upon the right side as well as the left of the abdomen, or even when it is in the cavity of the thorax. The essential condition is, that the orifices be free; yet if it be adherent to those parts with which in a natural state it has no communication; if, for example, it should open into the colon, or occupy the place of the

* *Journal Complémentaire du Dictionnaire des sciences médicales*, tome viii., p. 369.

rectum, of which deviation instances have been reported, although they are very incredible, it will be easily conceived that this infirmity would be regarded as one cause of non-viability.

The diseases of the stomach consist of different degrees of sanguineous congestion or of inflammation. Congestions of the stomach are of very common occurrence in young infants, and consequently but little importance ought to be attached to them with reference to the subject before us. As to congenital inflammations, they are generally the causes of very serious symptoms. Congenital gastritis consists almost always of a number of ulcerations, the borders of which are of a very shining carmine hue, and the bottom of a deep yellow. These ulcers result from the disorganization of the muciparous follicles of the stomach. The portion of the mucous membrane surrounding them remains white, notwithstanding the existence of inflammation, and the stomach generally contains a quantity of black sanguinolent matters, resulting from the sanguineous exhalation which takes place from these ulcers on the surface of the ventricle. When thus affected, the child exhibits no external sign of phlegmasia, and preserves its rotundity of form; but as soon as it is separated from the mother, and the gastric digestion becomes a process of the greatest importance, it then falls into a state of marasmus, and vomits all that is given to drink; brown matters, such as I have observed to exist in the surface of the organ, are discharged by vomiting; and it soon perishes if the ulcers, in place of cicatrizing, enlarge and become more numerous. This alteration of the stomach ought to be arranged among the causes which interfere with the development of life.

Gelatinous softening of the stomach occurs sometimes very soon after birth, so that one is led to believe that it has already existed during intra-uterine life. If such an alteration should be found in an infant which had died on the first or second day after birth, ought it to be pronounced viable? I think not; for according to all probability this alteration existed at the time of birth; and it is generally so rapid in its progress, and so fatal in its results, that a child born with this affection should be considered necessarily dying, and consequently as not born viable.

Congenital malformations of the intestinal tube are very numerous. A great number of instances are recorded in various

works, particularly in the learned one of M. Meckel.* Doctor Schaefer has published a memoir, in which also the principal anomalies of the digestive tube are pointed out.† Those which more particularly deserve our attention are interruptions of continuity, strictures, and obliterations. Every interruption of the intestinal canal ought to be considered as a cause of death. Obliteration will be more dangerous according to its position. Thus an infant having an obliteration at the duodenum, or some other part of the small intestines, at the cæcum, colon, and the upper two thirds of the rectum, ought to be regarded as non-viable; but when the rectum exists, and the obliteration is near the orifice of the anus, the child might still be considered as viable, since an opening into the anus has been several times made by an incision through the *cul-de-sac*, formed by the obliteration of the rectum. When this intestine is wanting, although it is possible to form an artificial anus at the sigmoid flexure of the colon, yet I regard this condition as a cause of non-viability, inasmuch as the operation resorted to in similar cases has, to this day, almost always caused the death of children, while it is not so when a superficial incision is made at the perinæum. Strictures more or less numerous throughout the extent of the digestive canal, are only embarrassments to the establishment of life, but ought not to be considered as an inevitable cause of death.

Congestions and intestinal hemorrhages, which are observed in infants at birth, phlegmasic alterations, such as inflammation and ulceration of the muciparous follicles, are also serious symptoms, but not absolutely mortal in young infants. It is not uncommon to see infants pass by stool, with or without the evacuation of the meconium, a greater or less quantity of blood, the result of intestinal exhalation arising from congestion of the intestines. Infants do not always die from this cause, especially in our climate; but this species of dysentery cuts off, on the contrary, a vast number in America, where cholera infantum prevails epidemically. If it be proved that a child can survive this disease, it must be admitted that it is not essentially mortal. This, how-

* *Manual of Descriptive and Pathological Anatomy.* Translated by Dr. Doane. London, 1838.

† *Journal complémentaire du Dict. des sciences médicales*, t. 24.

ever, is not so with the white or pultaceous softening of the mucous membrane of the intestines. I have, in three instances, seen this disorganization of the mucous membrane in children that were born pale and debilitated, and that died a very short time after birth. This softening I regard as a true disorganization of the mucous tissue which nothing can restore; the membrane, consequently, is incapable of discharging its digestive functions, which are of indispensable importance at the commencement of life, and at an age when nutrition is the dominant and essential function of the system. We should carefully guard against confounding this softening with the mucus that is often spread over the whole internal surface of the digestive tube of infants. I would, therefore, pronounce an infant non-viable where there was found to exist a universal and complete softening of the internal membrane of the intestines.

‡ III. URINARY APPARATUS.—Absence of a kidney can be no obstacle to the establishment of life; neither can nephritis from calculi, which is sometimes found in new-born children; but renal dropsy, an affection that has existed in infants at birth, is certainly a cause of non-viability. This species of congenital dropsy occurs in the following manner: an obstruction, whether it be stricture or obliteration, exists in some part of the ureters; in proportion as the kidneys are organized, the fluid which it secretes, finding no outlet, flows back into the pelvis and infundibuli of the kidney; the substance of the kidney becomes engorged and distended, and assumes the form of an agglomeration of vessicles—an arrangement analogous, in every respect, to what it has at the period of its formation; this vesicular mass is constantly augmenting; it at last produces a great distention of the abdomen, and soon causes the death of the child—an event of necessary occurrence with such an infirmity. This obstruction, instead of existing in the ureter, is sometimes found at the neck of the bladder, or at a part near the root of the pelvis; under such circumstances, both kidneys, and the bladder itself, are distended with fluid. The bladder may acquire an enormous size, and in advancing towards the abdomen, draw with it, out of the pelvis, the contiguous parts, dragging even the rectum from its place, presenting that malformation which has been described

under the name of coalition of the rectum with the bladder. An infant thus affected is evidently not viable.

If the rectum, in adhering to the bladder, opens into it in such a manner that the contents of the intestines find an outlet by this organ, viability will not be impossible. If an obstruction exist in the urinary passages, accessible to the surgeon, as near the gland, or in a portion of the canal between the root of the penis and the meatus urinarius, so that, with the aid of an incision, an artificial hypospadias can be formed, and in this manner give a free passage to the urine, I believe that then the infant may be regarded as viable, because, although affected with an infirmity which is adverse to the establishment of life, is not a cause of death which admits of no remedy. The extroversion of the bladder, an affection always coexisting with a separation of the linea alba, is not necessarily a cause of premature death, since individuals have been known to live to an age somewhat advanced with this infirmity.

Inflammation and tumefaction at the neck of the bladder may prevent the flow of urine, and cause a retention which soon ends in the death of the child. This lesion must not be lost sight of in the examination of the causes which may determine the death of an infant whose viability is brought in question.

§ IV. PERITONITIS.—Peritonitis may exist in new-born infants, either in an acute or chronic state; I have seen, in the dead bodies of two infants, that died, the one eighteen hours, the other twenty-four hours after birth, several old and well organized adhesions, uniting some of the convolutions of the intestines; one of these infants was pale, small, and thin, the other was in the ordinary good condition of an infant at birth. The existence of these products of phlegmasia ought to be taken into consideration when ascertaining the causes of an infant's death. Acute peritonitis has been several times seen in infants, who appeared to have brought the disease into the world with them. M. Dugès has reported several examples of this congenital affection in his inaugural dissertation. I have found acute peritonitis in three children that died a short time after birth. These phlegmasiæ are of a nature serious enough to endanger the life of the child, but, as they can be cured, they ought to be arranged

among the obstacles of life, and not among the necessary causes of non-viability.

Ascitis may be met with in infants at birth; the fluid which distends the abdomen is in greater or less quantity. In an infant born dead there was found nearly a pint of water in the abdomen, thorax, and other parts of the body; and what was the most singular in this case was, that the child was born of a dropsical mother (*Journal de Méd.*, par A. Roux, tome 17, page 180). Dr. Ollivier, of Angers, has reported an instance of encysted dropsy in a fœtus born dead. Congenital dropsy ought to be considered as an impediment to viability, for the abundance of fluid in the abdominal and sometimes in the thoracic cavity, hinders, in a very evident manner, the movement of the diaphragm, and the dilatation of the thoracic parietes in the act of respiration.

§ V. ABDOMINAL HERNIAS.—Umbilical hernia is not mortal; time, and proper surgical applications, can effect a cure, and even if they do not succeed, the continuance of this infirmity is no obstacle to the indefinite prolongation of life. It is the same with congenital inguinal hernia; but when one part of the abdominal viscera escapes by an opening in the parietes of the abdomen, in such a manner that the liver, intestines, and the mesentery are exposed, no doubt can exist in reference to the non-viability of the child, which, if not born dead, must soon expire.

§ VI. RESPIRATORY APPARATUS.—The integrity of the respiratory apparatus in an infant at birth, is one of the first conditions of viability; indeed, it is in this apparatus that the principal phenomena occur, which establish the passage from intra-uterine to independent life; it is this which is the source of new life to the infant, and consequently all the lesions that are developed in it may endanger its existence. Medical jurists only admit infants to have lived when they have respired; for with them to respire is to live; it follows, therefore, that whatever is adverse to respiration, is likewise adverse to life. Let us, on this account, examine with particular care the congenital malformations and affections of the respiratory apparatus; comprehending, in this term, the nasal fossæ, larynx, trachea, and lungs. The congenital malformations of the nose, the union of the two lateral nasal fossæ, forming thereby but one cavity, almost always exist with a malformation of the face or cranium, such as mo-

nopsia, anencephalia, or hydrocephalia; and experience proves that a fœtus so affected can scarcely live, only a few moments, more by reason of the complication of these organic deviations, than by the deformity of the nasal fossæ; this monstrosity, therefore, must be regarded as a cause of non-viability. The larynx is habitually the seat of a passive congestion, more or less complete, in infants at birth; care must be taken not to regard this redness, which almost always exists in this tube in young infants, for a phlegmasia; the trachea and bronchiæ are very often obstructed by mucus, which, if it is abundant and viscid, opposes an obstacle to the introduction of air into the lungs, and is therefore evidently a condition opposed to the establishment of life. Congenital inflammation of the larynx and of the trachea is rarely seen; I do not know of an authentic instance; but if sanguineous congestion and accumulation of mucus can oppose the establishment of respiration, it is easily conceived that simple phlegmasia, or phlegmasia complicated with an alteration of secretion, occurring in the latter period of intra-uterine life, would very considerably hinder the establishment of life.

Congenital malformations of the lungs are not common, but those of the cavity of the thorax are frequently seen; when the parietes are defective, in such a manner as to expose the heart and lungs, the child must necessarily perish. Bianchi and Fracassini have given several examples, as quoted by Haller. Inversion of the right lung to the left side, and vice versa, offers no impediment to life. Congenital malformation of the thorax, which opposes a free expansion of the lungs, very seriously influences respiration, and gives rise to symptoms which are continued even to a period far advanced in life, according to an account given by M. Dupuytren; but the simple lateral depression of the thorax, while it is the source of some symptoms, it certainly is not a cause of death. If the malformation of the thoracic parietes exist at the diaphragm; if, for example, a perforation of this muscle allows the abdominal viscera to penetrate into the cavity of the thorax, we can, without hesitation, pronounce the child non-viable; for it is impossible for life to be prolonged with such an organic deviation; it can only live where a small portion of the organ has protruded.

Inflammation of the pleura, lungs, or bronchiæ, may take place

before birth; some authors, and among them Mauriceau, have reported instances of its occurrence. I have seen, in three infants that died on the first day after birth, a hepatization of the lungs, sufficiently advanced to cause the belief that, if this hepatization had occurred during intra-uterine life, it was at least developed during birth, or immediately after parturition. Whatever may have been the period of its development, it was evident that it had arrested the establishment of respiration, and consequently caused the death of the child. I have also found, in an infant that died some days after birth, evident traces of chronic pleurisy, which doubtless was the cause of the extreme feebleness with which this child was affected. These facts should lead us to the belief that infants born with congenital pneumonia are not viable. It is the same with new-born children that respire with greater or less facility during the first hours of their existence, and where pneumonia or a pulmonary engorgement supervenes, drives out the air already introduced into the pulmonary tissue, does not allow it to penetrate anew, and in this manner renders these organs unfit to discharge their functions. I have noticed several facts in support of this opinion, which have been communicated to Professor Orfila.

There is still another circumstance which is adverse to the introduction of air into the lungs, and which renders the child incapable of independent life; I refer to the extreme feebleness of the infant, and the difficulty with which it dilates the thoracic parietes, which, remaining almost immoveable, do not perform the movements of inspiration by which the air suddenly passes into the air-passages and penetrates the tissue of the lungs. Notwithstanding this non-existence of respiration, children may yet live some hours, and even days; and if the lungs are examined after death, not the least trace of air will be found in them. The following example, which I met with at the Hospice des Enfants Trouvés, is in support of what I have asserted. Three infants born at one birth, on the night of the 21st of October, 1826, were brought immediately to the institution; they were all feeble, and, as it were, dying; one of them died eleven hours after birth. The *docimasia pulmonum* was made with the greatest care, yet not the slightest trace of air could be found in the pulmonary tissue; the lungs exhibited nothing more than a slight

sanguineous congestion at their borders ; at no point were they hepatized ; therefore it was not the presence of blood in the cells of the lungs which opposed the introduction of air ; but its absence was owing to the entire inability of the infant to dilate the thoracic parietes in a manner that would render the lungs permeable to the air.

It is possible, therefore, for an infant to live without respiring, and consequently to live without being viable ; this fact, which we have already demonstrated, when considering certain congenital malformations which of necessity result in death, is here exhibited in a new form. But it should be recollected that the life of an infant that does not respire presents peculiar signs, which distinguish it from independent life, properly so called. Let us examine these signs.

It is difficult to explain the cause which sustains the precarious life of an infant, that languishes for some hours after birth. Does it still live by its embryotic life ? that is to say, does the oxygenation of the blood, from its mixture with that of the mother while connected with her, still continue for some time to sustain existence ? Or does the infant absorb a sufficiency of oxygen by the mucous surfaces exposed to the contact of the ambient air, to enable this agent of life to animate the debilitated being of which we are speaking ? These are nice questions, and which the state of physiology at the present day does not enable us to answer. Be this as it may, the signs of life in an infant where the respiratory system cannot discharge their functions are confined to the following : 1st, The pulsations of the heart are always slow, obscure, and irregular. 2dly, The motions of the lips and of the limbs are very slow, and almost nothing ; the muscles of the face are immoveable, or are from time to time pinched, to return shortly to the state of immobility, which imparts to the physiognomy its peculiar trait of destitution of expression. 3dly, The cry, which in its natural state is composed of two distinct parts, the one corresponding with inspiration, the other with expiration, is here only heard in one of its parts—that which arises from inspiration, and consists of an acute sound, more frequently smothered, and generally tremulous and jerking. Lastly, the integuments are cold and livid, in place of possessing the soft and halitous warmth, so peculiar to infants at birth.

From such an assemblage of signs of imperfect life, it is, that midwives and even physicians often take their evidences of viability; and upon these data, frequently more vague from their incapability of appreciating them, are based their examinations and their reports; and judges, who are obliged to pronounce upon the viability of an infant, upon whose life important interests often depend, are exposed to the hazard of declaring an infant viable that was not so. We should not, therefore, be hasty in pronouncing upon the viability of an infant from the symptoms which were observed during life, but decide only after a post mortem examination is made. In vain would the witnesses affirm that they saw the child move, cry, and even attempt to take the breast; if the lungs have not been filled with air, the child could not have been viable, although it may have lived; because it had not lived the extra-uterine life—viability consisting in the establishment of independent life, and in the absence of every cause that may prevent its prolongation. Neither should a child be considered as viable, that during birth was suddenly attacked with pneumonia, in consequence of which the air was more or less completely expelled from the lungs. There then occurs a kind of struggle between the attempts of nature to establish life, and the pathological causes which oppose it. The death of the infant from the first moment of birth is the inevitable result of such a disorder.

If at the end of some days, after the respiration has been fully and regularly accomplished, the child dies from a phlegmasia of the pleura or lungs, it ought not on that account to be regarded as non-viable; but the affection which has supervened ought to be taken into account, and considered solely as being adverse to the prolongation of extra-uterine life. I have, in several instances, seen infants that at birth respired perfectly well, affected with an hepatization supervening in the tissue of the lungs, by which the air was expelled from them; but I never saw both lungs so completely hepatized that no portion of their tissue was without air.

Simple pulmonary congestion without inflammation is equally embarrassing to the introduction of air into the lungs. There exists between respiration and circulation so close a connection, that a disturbance of the one will almost necessarily produce a

disturbance in the other. Some children exhibit at birth so great a sanguineous turgescence, that blood is exhaled in all parts, and remains stagnant even in the parts that are the least depending. The heart, lungs, and liver are more especially affected with this congestion; the lungs do not then receive the air which the infant inspires, or at least receive but a small part of it. Children born in this condition have ordinarily their limbs œdematous, and the integuments of a violet hue; their movements are slow and difficult, and their cry is almost always stifled. The beatings of the heart are obscure, and the pulsations almost imperceptible. The child, in a state of sinking and prostration, languishes for some hours, or even days, and at last dies. On opening the body, a small quantity of air will be found at the anterior border of the lungs, the greater part of which will be gorged with blood, with their surface emphysematous. In such a case, a mechanical obstacle hinders the air from penetrating the lungs, and death occurs from asphyxia. An infant, born and dying under these circumstances, cannot be pronounced viable; for death is the most ordinary consequence of this congenital sanguineous plethora.

§ VII. CIRCULATORY APPARATUS.—Congenital malformations of the heart are not all causes of non-viability. An unusual situation of this organ without complication, such as the existence of the heart on the right side of the thoracic cavity instead of the left, is not an obstacle to the establishment of life; but when it is situated in the abdomen, with a deficiency of a greater or less portion of the diaphragm; or when the parietes of the thorax are open, allowing of its escape from its proper cavity; and lastly, when this transposition of the centre of the circulatory system is accompanied with an anencephalia, or acephalia, coincidents not uncommon, as M. Breschet has demonstrated in his memoir on ectopia of the heart, then the infant cannot be regarded as viable. Absence of one of the lateral portions of the heart, so as to leave as it were a single heart, is also opposed to viability. Dr. Mauran, physician in Providence, America, has recently published a case of a heart having but one auricle and one ventricle. The child was affected with cyanosis; lived fifteen days; during which time it was attacked with frequent syncopes, and threatened constantly with suffocation. It perished

in one of these attacks of suffocation. The separation of the heart into parts, I think, ought to be arranged among the causes of non-viability.

As to the malformations which consist in a narrowness of the orifices, or in a deformity or incomplete development of the valves, they present less danger to the life of a child than the preceding malformations; they hinder the exercise of the regular functions of the heart, and give rise to some peculiar symptoms; but they are not necessarily a cause of death, since individuals are seen living to a very advanced age with such congenital malformations. It is the same with the persistence of the foramen ovale, which is sometimes seen at an age considerably advanced, and which, although productive of some serious symptoms, will not on that account cause the individuals to perish. I once found a scirrhus tumor in the anterior part of the left ventricle. This alteration, I think, ought to be considered as a cause of non-viability, for it is known that it is the character of scirrhus tumors to be always growing, and at the same time to make rapid progress. Now the progress of these tumors will inevitably derange, or even interrupt the functions of the heart of the infant, if death does not occur a short time after birth. Anomalies in the distribution of vessels are not always a cause of death, because no part of the system possesses greater facilities of supplying deficiencies in the organs than the vascular. The multiplied divisions, communications, and relations of the different branches of an arterial trunk, are well adapted to restore the course of the blood through the different parts of the obliterated portion. The admirable researches made during the last twenty years on the subject of the diseases of the heart and bloodvessels, have unveiled to us, in cases like these, the great resources of nature.

The anatomical examination of the circulating organs of an infant at birth, show that the passage from intra-uterine to independent life is effected by transitions prepared and conducted in some manner by nature. The obliteration of the fœtal openings occurs gradually; already narrowed at the period of the expulsion of the fœtus from the uterus, they are not entirely closed until some days after birth, and this gradual transition from the form of the fœtal heart and vessels to their ordinary

form, is productive of no symptom in the young infant; it is therefore very common to find the foramen ovale and ductus arteriosus open in the child several days after birth: this persistence of the fetal openings, in the case of the death of a child, must not be considered as a cause of its death; and if it be not complicated with some lesion, or other congenital malformation, the child thus affected ought not to be pronounced non-viable. I once found an aneurism of the arterial duct in an infant four days old, that during life did not exhibit the least symptom of such an affection. This aneurism, which was about the size of a cherry-pit, contained a layer of fibrin, which had begun to obliterate the canal; thus anticipating, as it were, the symptoms which might have resulted from an abnormal obliteration of its canal.

Pericarditis is sometimes observed in infants at birth. This inflammation is very rapid in its progress, and very serious in its results, the child affected dying very soon after it is attacked; in seven cases of this disease which I met with during the year 1826 at the Hospice des Enfants Trouvés, I found two infants in whom it had been fatal the second day of their birth. I once found in an infant of two days, adhesions between the laminæ of the pericardium, of so great solidity as to warrant the belief that they were the product of a former pericarditis, developed during the formation of the fœtus. When an infant dies from pericarditis on the day or the day after birth, it ought, I think, to be declared non-viable, because all circumstances would lead to the belief that it had brought the affection with it from the womb, and the violence of the inflammation would necessarily embarrass and suspend the important functions of the heart at a period when the blood takes a new course, and the centre of the circulating system needs the assistance of additional activity.

§ VIII. CEREBRO-SPINAL APPARATUS.—The cerebro-spinal apparatus is subject to frequent anomalies; almost all of them cause the death of the child; these organs being the centre of life, nothing can supply their place when they are wanting either in whole or in part. Yet they offer still different degrees of deformity, according to which the child is more or less viable, if I may so speak—that is to say, that these deviations of the cerebro-spinal apparatus may have, in certain cases, such an influence

over the rest of the system as to determine promptly and necessarily the death of the child, while under other circumstances it may live for a length of time, although affected with a congenital malformation of the encephalic organ. The analytical examination of these different cases will enable us to understand their difference.

Complete acephalia is always a cause of death, and requires no comment; it is the same with anencephalia.

Anencephalia consists, as is well known, of absence of a part of the brain to a greater or less extent; the brain is imperfect in consequence of an arrest of development, or of a cerebral or meningeal affection, occurring during the sojourn of the infant in the womb. It is necessary to distinguish cerebral atrophia from anencephalia.

Atrophia, or imperfection of the cerebral mass, is no obstacle to viability. Children are seen born with a cranium and brain extremely small; the forehead is sometimes so depressed that the face assumes a peculiar expression, having a nearer resemblance to that of an inferior animal than to the head of a human creature. Yet children affected in this manner live, and exhibit nothing different from others, so long as the vegetative life is the only one existing. Should they arrive at an age when the intellectual faculties are developed, their intelligence is nothing, or almost nothing, possessing scarcely any other consciousness than that of their physical or instinctive wants. In a word, they continue idiots during life; for nothing is more common than to meet with a kind of cerebral atrophia in idiots. In these individuals, says Georget, the forehead retires very obliquely backward, which gives to them a great resemblance to the lower animals. The cranium of an idiot is sometimes no more than sixteen, seventeen, or eighteen inches in circumference; those of sixteen inches bear but little resemblance to the human head.* I saw at the clinical course of M. Esquirol, at the Salpêtrière, a plaster model of a young idiot, the anterior part of whose brain was so flattened and depressed that it resembled, in every respect, that of a sheep. At the hospital at Angers, I examined the body of an idiot that died at the age of fifty years; the cranium, very much

* *De la Folie.* Paris, 1820.

depressed at its anterior and lateral parts, arose in a point towards the occiput; the bones were of remarkable thickness, while the brain was reduced to a very small size; the cerebral hemispheres were two thirds smaller than what is common in men; and what is still more remarkable, the cineritious matter consisted of nothing more than a thin lamina; the atrophica of this organ appeared particularly to have occurred in this substance.

These different cases of cerebral atrophica, which are to be regarded as the first stage of anencephalia, are met with in individuals that are viable, since they have arrived at a considerably advanced age. Let us observe, besides, that their viability is to be considered as referring to vegetative life. Now, this kind of suspension of cerebral evolution, without doubt, hinders the development of the intellectual faculties. But of what importance is it here that the moral faculties remain fixed at the lowest degree of human intelligence, provided the conditions of vegetative life are fulfilled? And viability so effectually exhibits itself here in its plenitude, that individuals in whom cerebral atrophy coincides with their nullity of ideas, often arrive, in the course of their life, at a state of physical development strongly in contrast with the emaciation and debility of those feeble and sickly men, in whom we admire the possession of all that the human thought has of the brilliant and sublime. It is not uncommon to find, among those men whose scientific or literary productions have rendered illustrious, beings so ill-favored as Pascal and Pope. It is well known that the diminutive size of Winslow presented a striking contrast with the strength of his intellectual powers.

The smallness of the cranium and brain in infants that afterwards become idiots, is no obstacle to viability, which, considered in the rigorous acceptation of the term, indicates particularly an aptitude of vegetative or organic life.

But when anencephalia arrives at a stage much more advanced than that which we have just described, the existence of the child is more doubtful, and it may be said that the degrees of viability diminish in proportion as the brain becomes more disorganized. I found at the Hospice des Enfants Trouvés a case which exhibits the intermediate stage between cerebral atrophy, of which we have been speaking, and anencephalia

advanced to the degree necessary to cause the death of the infant.

CASE.—On the 26th of January, 1826, there was brought to the Hospice des Enfants Trouvés a female infant named Verdelet. A paper attached to the arm mentioned the age of the child to be twenty-four days; it was of medium strength; size seventeen inches; the integuments were purple, cry stifled, thorax slightly sonorous on percussion; forehead very much sunk, and the parietal region depressed. From the close approximation of the bones of the cranium, there existed no anterior fontanelle. At the occiput, about the lambdoidal suture, there was a blunt projection. The eyes projected outside of the orbit, the superior borders of which were depressed. The head, inclined backward, and the face directed upward, gave to the physiognomy of this infant the peculiar expression of anencephalia. This child died on the 11th of February, without presenting any other symptom than those pointed out above. Upon a post mortem examination, the lungs were found hepatized at their summit and posterior border. The foramen ovale was still open, but the ductus arteriosus was obliterated. The cranial vault and the posterior portion of the vertebræ being removed, the medulla spinalis was found perfect throughout its whole extent; the corpora pyramidalia and corpora olivaria were very much developed. In examining the brain from behind forward, the pons varolii, tubercula quadrigemina, infundibulum, tuber cinereum, the pituitary gland and commissure of the optic nerves, were found in their normal state. The distinction between the posterior and middle lobes was well marked; but the anterior lobe could scarcely be recognized, and instead of presenting a slightly convoluted and furrowed surface, there was nothing to be seen but two reddish eminences about the size of a filbert, separated from each other by a slightly-marked division, but reunited posteriorly by the anterior commissure; at the anterior part there did not appear the fossæ in which are lodged the olfactory nerves; but they were blended posteriorly with the cerebral substance, from which they were separated anteriorly, and their terminations reflected on themselves and rounded, were attached to the lateral apophysis of the cristi galli. When the brain was examined superiorly, the posterior part of the hemispheres was found developed as in the natural state; but the convolutions were suddenly interrupted in the anterior part of the brain, and ceased in the direction of a line which would be in continuation of the fissure of Syl-

vius. The superior and anterior part of the brain was consequently wanting altogether. There did not exist any corpus callosum; the posterior commissure was the only vestige of it. There was no septum, consequently the anterior part of the lateral ventricles was exposed. Immediately before the interruption of the convolutions, there was a depression, in which was found a membranous pouch, enclosing a small quantity of citron-colored serum, formed probably from the pia mater and tunica arachnoidea, which were filled with vessels. This pouch had no external opening. When cut longitudinally, two small olive-shaped eminences were exposed, separated by a deep furrow, and upon which were two white bandalettes, united anteriorly in the form of a V, and separating posteriorly, so as to extend below the interrupted convolutions. These were the rudiments of the fornix. Between these bands an interval was left, which is usually occupied by the septum lucidum. The anterior projections, rugous and irregular, were evidently formed by the thalami nervorum opti-*corum*, the internal borders of which constituted the third ventricle, communicating largely with the lateral ventricles by means of the fornix, below which was seen the tela choroidea. On each side of the fornix was seen the posterior extremity of the plexus choroides. When the posterior portion of the cerebral hemispheres was removed, the lateral ventricles were seen to be continued behind, spread and form as usual, the ancyloid cavity. Behind the thalami optici the corpora striata could scarcely be distinguished, but some pulpy matter presented a few traces of them; the cerebellum was perfect.

The vessels from the vertebral and carotid arteries were distributed at the base of the cranium, in the accustomed manner.

One of the principal branches of the carotid was directed towards the point corresponding with the fifth ventricle, and sent branches which lost themselves between the convolutions, and others spread over the surface of the membranous pouch of which I have spoken. All the nerves of the base of the brain were in their points of origin and disposition perfectly normal. The base was slightly depressed in its lateral parts, so that the anterior fossæ were much less developed than the middle and posterior.

I have reported this case in detail, to show that an infant can live a long time with the absence of some one of the parts which constitute the encephalic mass. The form of the cranium corresponded with the deformity of the brain, and it might be

thought that the brain of this child was analogous to those of the idiots of which we have spoken ; but there not only existed in this case an atrophy of the organ, but likewise an absence of several portions which enter into its composition. This advanced stage of anencephalia ought to be regarded as a cause of non-viability. This infant lived without being viable ; that is to say, without exhibiting the organic conditions which are indispensable to a prolongation of independent life.

Deformity of the cranium does not always exist in conjunction with congenital malformations of the brain. M. Breschet has given several instances of well-formed crania, containing a mutilated and incomplete brain. To the facts with which he has enriched science I can add the following case.

CASE.—Noblet, aged three days, a male, entered the Hospice des Enfants Trouvés on the 11th of March, 1826. During his continuance in the hospital he cried, sucked his thumb, and took the breast of the nurse. He was examined on the twelfth, and directed to be sent to the country on the next day, but died during the night. The post mortem examination was made on the succeeding day ; the child exhibited exteriorly a good condition ; several livid marks were upon the body. Follicular ulcers were found in the stomach, and there was a general congestion of the intestinal tube. The lungs were healthy and crepitating.

The cranium presented a very strongly-marked development ; but when opened was found to be filled with a membranous pouch, covered with a number of vessels, and filled with a fluid having the appearance and color of the white of an egg. It was easy to discover that this pouch was formed of the pia mater and arachnoidea. As soon as it was pierced, the liquid matter flowed out upon a mass of cerebral substance, at the base of the cranium, of which I shall presently give a description. The medulla spinalis was perfect ; the corpora pyramidalia and corpora olivaria were fully developed ; the cerebellum was well formed ; the pons varolii also presented its usual size and form, but the anterior cornua gave rise to four projections, two on the left and two on the right side ; the internal ones appeared to be the vestiges of the thalami optici, and were separated by an interval which in a healthy state would have constituted the third ventricle. The two others appeared to be the vestiges of the corpora striata ; they were partly covered by a membranous fold

which appeared to be the plexus choroides. Lastly, outside of the parts described there was found a pulpy mass, flattened and very soft, and which without doubt represented the rudiments of the two cerebral hemispheres. These two portions of cerebral substance were confounded with the internal surface of the meninges, which was found covered with the pulpy appearances very analogous to the substance of the brain. When the inferior surface of this rudiment of brain was examined, the olfactory nerves were found to exist only in the form of thin, fragile, medullary filaments. The commissure of the optic nerves was scarcely visible; the nerves at the place where they arose were almost nothing, while in the orbit they possessed their usual development. All the other nerves at the base of the brain were developed in the ordinary manner. The arteries furnished by the carotid and the basilar trunk of the vertebral artery, had their usual distribution, and their branches were sent to the walls of the pouch formed of the meninges. There were therefore wanting in this brain, 1st, the entire two hemispheres; 2dly, the corpus callosum; 3dly, the fornix; 4thly, the lateral ventricles; 5thly, tela choroidea; 6thly, the anterior and posterior commissures.

If the cranium of this child had not been opened, the cause of its death would not have been suspected, and perhaps it would have been pronounced viable. Life was maintained during the three days by the nervous influence of the medulla oblongata, which the organic deviation did not affect.

It is not necessary to demonstrate the non-viability of an anencephalous fœtus, where the cranium is destroyed and perforated; it is well known that such a one can exist but a few hours.

I ought to point out apoplexy of new-born infants as a cause of death, and particularly the general softening of the brain, which is sometimes found in young infants, mixed with thickened blood, and diffusing a strong odor of sulphuretted hydrogen, indicating evidently the decomposition of the organ.

Hydrocephalia is not a cause of non-viability, except when the cranium is of a great size, and the fontanelles are widely spread. In this case, the cerebral ventricles are inordinately distended, and their walls softened and disorganized. Encephalocele, which sometimes accompanies dropsy of the brain, likewise renders the existence of the infant too precarious to allow us to expect it to live: encephalocele, without hydrocephalia, is not ne-

cessarily a cause of death : M. Lallemand found a hernia of the cerebellum in an aged woman at Salpêtrière. But when hydrocephalia only exists with an enlargement of the cranium, and especially when the fontanelles are but slightly enlarged, it may be reasonably expected that the child will live even to an advanced age. Camper has observed that hydrocephalic infants will live so much the longer, as the bones of the cranium are more approximated, and their sutures are more solid : sometimes hydrocephalia is really an obstacle to viability. Meningitis, which supervenes sometimes immediately after birth, and which produces convulsions, is not a cause of death in all the infants affected with it ; it should not, therefore, be regarded as absolutely mortal. Fractures of the cranium are not serious except from their complications. Congenital malformations of the medulla oblongata are always fatal ; hydrorachis, complicated with spina bifida, is not always to be considered as a fatal affection. And indeed when the integuments of the tumor are perfect, the child may arrive at quite an advanced age ; the progress of ossification may even lead to a perfect cure ; but when the tumor is ulcerated, death is inevitable.

Congenital malformations of the genital organs, such as imperforation or absence of the vagina, are without doubt very serious, but are not mortal in infants at birth ; and death may not even occur at the period of puberty, since the menstrual evacuation has occurred from other surfaces than that which ordinarily secretes it ; consequently we ought not to regard infants as incapable of living, that are affected with these congenital malformations.

Fractures, luxations, or divisions of the limbs, are not causes of non-viability.

The various cases of duplicate monstrosity, either by inclusion or coalition, cannot be submitted to general rules ; but it is necessary to examine each case by itself, to appreciate properly the degree of viability of infants affected with this species of monstrosity.

I shall here terminate the analytical examination which I proposed to make of congenital malformations and diseases affecting the principal organs of an infant at birth. Let us now see what are the inferences which may be drawn from this analysis.

PART SECOND.

MEDICO-LEGAL INDUCTIONS.

THE question of viability, in medical jurisprudence, presents itself in several points of view; sometimes there is required from the physician different investigations, according to the information necessary to be obtained. Should infanticide be the question at issue, it will be necessary to ascertain, 1st, whether the infant was full grown; 2dly, whether it was born living; 3dly, whether it was viable; 4thly, whether it had lived. If, on the contrary, the questions to be decided refer to grants or testamentary discussions, the question of viability will present itself in a different form; for there are almost always two parties opposed, the one maintaining that the infant lived and was viable, and the other assuming the contrary; and it will be necessary in the first place to show whether the infant had lived. Verbal testimony and the *docimasia pulmonum* will ascertain this point. If the child had not lived, and should the assertions of witnesses be contradictory, the physician, on ascertaining that there was not the least trace of air in the lungs, ought to discontinue any further investigations, for the question is settled by this fact; and in vain will it be alleged that the infant had respired, and that pneumonia had supervened and had driven the air from the lungs; and although we have before demonstrated that the development of pneumonia before birth, or during the establishment of respiration, ought to be considered as a cause of non-viability, yet the physician could not conscientiously affirm that the infant had lived, since he was not in possession of incontestable evidence of it; moreover, it is very rare for pneumonia to drive out all the air contained in the lungs.

If a small quantity of air be found in the lungs, and the attestation of witnesses is in favor of the life of the infant, the physician, before pronouncing upon its viability, ought to examine whether the signs of life spoken of are not analogous to those which we have already remarked as manifested in those infants where

the respiration is incomplete and irregular; if such be the case, he must declare the infant not to have been viable, and that it had not been in full possession of independent life. Lastly, even when all the signs of independent life exist in an incontestable manner, it will still be necessary to be well assured that there is no congenital malformation, nor any serious lesion in any organ essential to life: thus, for example, an infant may respire well, but if affected with an obliteration of the intestinal tube must necessarily perish; consequently cannot be reputed viable.

Death arising from congenital affections takes place at extremely variable periods; a non-viable infant may live eight, ten, or fifteen days, as we have seen in a subject where the heart was single, and that died fifteen days after birth: a child may also perish from a disease the nature of which is not necessarily opposed to viability, on the day of birth or the day after. Consequently the principle ought not to be laid down, as has been done by Professor Chaussier, that every infant attacked with a disease in the uterus, that dies within twenty-four hours after birth, whatever be the cause, should be reputed non-viable. (Chaussier, *Mémoire médico-légal*, adressé à M. le garde-des-sceaux.) Indeed, on the one hand, all diseases that are developed in the fœtus in the womb, are not essentially mortal; and on the other, the diseases essentially mortal which the infant brings with it at birth, do not always cause death within twenty-four hours after birth.

The indispensable conditions then of viability, considered with reference to the anatomy, physiology, and pathology of the fœtus, I conceive to be as follows:

1st, The child ought to be born at the full time: 2dly, No physical or pathological obstacle should exist adverse to the establishment of respiration and independent circulation: 3dly, When respiration and circulation are established, the body of the fœtus should present no monstrosity, no congenital disease capable of causing death sooner or later. Now the examination of these particular lesions deserves especially to fix our attention, as by considering them we will be able often to cause truth to triumph, whether the question be to establish the fact that the child had not lived, or to demonstrate the contrary. In order properly to appreciate these lesions, it has appeared to me expe-

dient to divide them into separate classes, according to their importance: the one being essentially mortal; others embarrassing the development of life, without being essentially a cause of non-viability; and the last offering no opposition to the establishment of life: thus, an infant born with an obliteration of the œsophagus, is not viable; another coming into the world with gastritis, or cutaneous phlegmasia, may live; another bringing with it a fracture of one of the limbs, or hare-lip, is unquestionably viable. This distinction is of the greatest importance; for those born with infirmities or diseases of the first order will admit of no discussion upon their viability; those of the second order may be extenuating circumstances in questions of infanticide; those of the third order can never be considered as causing non-viability.

In order to render the data upon the question of viability more positive, it would be desirable that a commission of enlightened physicians should cause a view of congenital diseases, arranged according to the distinctions which have been advanced, to be drawn up; this tabular view, founded on anatomical and pathological principles, might serve as a base to magistrates and physicians to judge of the viability of an infant, when it is necessary to show the relative value of some congenital disease, in order to prove whether the child was viable or not.

I have subjoined a table of this kind, which doubtless some one better qualified than myself might correct with advantage, and which will not be considered of as much importance as if it were examined and discussed by a commission of intelligent physicians.

TABULAR VIEW OF CONGENITAL DISEASES,

WHICH MAY BE CONSIDERED AS HAVING AN INFLUENCE ON
THE QUESTION OF VIABILITY.

ORDER I.—*Congenital malformations and diseases necessarily mortal.*

Absence of the skin, with imperfection in the parietes of the splanchnic cavities. (Eventration.)

Obliteration, division or duplicity of the œsophagus.

Ulcers and gelatinous softening developed in this organ before birth.

Obliteration of the stomach.

Its gelatinous softening developed before birth.

Obliteration and division of the superior, middle, and a third part of the inferior portion of the digestive canal.

General softening of the intestinal mucous membrane developed before birth.

Dropsy of one or both kidneys.

Coalition of the obliterated rectum with the bladder.

Deformity of the nasal fossæ with monopsia.

Hernia of the abdominal organs into the cavity of the thorax.

Inflammation of the pleura, lungs, or bronchia, before or during birth.

Impossibility of dilating the thoracic parietes, from extreme debility of the child. (Feebleness of birth.)

Congestion of the heart and lungs at the time of birth.

A single heart, or that consists of but one auricle and one ventricle.

Division of the heart into two parts by a complete separation.

Pericarditis developed during intra-uterine life.

Acephalia.

Anencephalia.

Congenital malformation of the medulla spinalis.

Hydrocephalus, with deformity of the cranium.

Encephalocele, with hydrocephalia.

Apoplexy, complicated or not with fracture of the cranium—occurring before or at birth.

Softening of the brain.

Hydrorachis, with ulceration of the tumor.

ORDER II.—*Congenital malformations and diseases, which, without being necessarily mortal, may be adverse to the establishment of independent life.*

Ecchymoses, contusions, sanguineous tumors, and cyanopothia.

Nævi materni very much developed.

Cutaneous inflammations.

Adheslon of the lips.

Inordinate length of the tongue.

Extreme narrowness of the œsophagus.

Simple œsophagitis.

Follicular ulcers in the stomach.

Simple strictures of the intestines.

Imperforation of the anus.

Intestinal hemorrhage.

Calculous nephritis.

Peritonitis, with or without dropsy.

Congenital malformation, or depression of the thoracic parietes.

Communication to a greater or less extent of the auricles or ventricles of the heart.

Hydrocephalia but little advanced, and without a separation of the bones of the cranium.

Imperforation and absence of the vagina.

Accumulation of mucus in the bronchiæ.

ORDER III.—*Congenital malformations and diseases not adverse to viability.*

Simple absence of the skin.

Cutaneous excrescences.

Excessive development of the pilous system.

Albinism.

Stationary nævi materni.

Hare-lip.

Division of the velum.

Deviation of the stomach, transposition of the abdominal viscera.

Absence of one of the kidneys.

Hypospadias.

Extroversion of the bladder.

Umbilical and inguinal hernia.

Transposition of the heart.

Stricture of its orifices, anomalies of the valves.

Persistance of the foetal openings for some days after birth.

Cerebral atrophy.

Hydrorachis, without ulceration of the tumor.

Fractures, luxations, and divisions of the limbs.

If this tabular view were discussed and properly digested by physicians, and sanctioned by law, it would be desirable to establish the following rules relative to viability considered with reference to the pathology of new-born children :

1st, No child shall be considered viable that, having respired, is affected with a disease mentioned in the first order.

2dly, Every child born with a disease comprised in the second order shall be considered as viable, but affected with a lesion that embarrasses life.

3dly, Every child, having respired, that is affected solely with a disease indicated in the third order, shall in every instance be considered viable.*

* See Appendix.

APPENDIX

BY THE TRANSLATOR.

SEPARATION OF THE CORD.

Note to page 30.

We can scarcely coincide with the opinion that the separation of the cord arises from mechanical causes; the phenomenon or appearances of inflammation are of still too frequent occurrence upon the separation of the cord, to attribute it to these causes.

The conclusions to which the author arrives, from the circumstances he notices, as to the desiccation of the cord, will be admitted as tenable in a large majority of cases; it nevertheless would be scarcely safe in medico-legal discussions, to place so complete a reliance on them; they can only be considered as strong corroborative testimony as to the previous life or death of the child.

HEMORRHAGE FROM THE CORD.

Fatal hemorrhage from the cord will sometimes take place from the slipping of the ligature. This, however, can scarcely ever occur, except from great carelessness; although it may happen where the cord is œdematous and of unusual size, and even when precautions are taken to prevent so unfortunate an event. A case of this kind occurred to the writer. The cord was œdematous and of great size; three ligatures were successively applied, and each drawn very tight, and the attention of the nurse particularly directed to its condition. The child falling asleep, no further thought was bestowed on it by the attendants, until the low moaning of the infant caused the nurse to take it up, when the clothes were found filled with blood. The ligatures upon the cord were completely loosened, from the constant oozing of the fluid from its extremity. The infant was cold and pulseless; the face purple and shrivelled; and it died in about an hour after the discovery of the hemorrhage.

It is well known to practical observers, that a fatal hemorrhage may also arise from the umbilicus, from ulceration rapidly occurring at the cord ; and further, that independently of the loss of blood, the disordered changes which occasionally occur from suppurative irritation at the navel, may prove destructive to the life of the child several days after birth.

When hemorrhage takes place from ulceration, a compress, with an astringent, such as powdered alum, should be applied ; and in case of failure of this means, it has been usual to recommend the actual cautery, escharotics, and the application of a ligature to the vein. But compression is probably the best method of arresting the hemorrhage ; and as a compress cannot always be depended on, pressure with the finger is undoubtedly the best ; and where it is necessary to continue it for a length of time, it may be done by changing the assistants at proper intervals.

When ulceration occurs at the navel, a gently astringent wash will be found to be the best application ; if there be much inflammation, a poultice of slippery-elm ; and if it become gangrenous, a weak solution of chloride of soda will be the remedies indicated.

SIZE AND WEIGHT OF NEW-BORN CHILDREN.

Note to page 37.

The average length of male children is greater than that of female. Ræder found the length of sixteen male children to be $20\frac{1}{2}$ inches, and of eight female, $20\frac{1}{4}$. Sæmmering states the most rapid increase of the fœtus takes place during the first week of conception, and that it does not proceed in the same ratio ; but that it is retarded in the second month, accelerated in the third, again retarded in the fourth, accelerated again in the sixth, and once more retarded to the end of the ninth month.

It ought to be remembered that the English inch is 1.065977 Paris inch.

Dr. Hunter states that several thousand new-born and perfect children were weighed at the British hospitals, by Dr. McCauley, and the smallest found to be 4, and the largest 11 pounds. Of 60 male and 60 female children, weighed by Dr. Clark, the lightest weighed 4, and the heaviest 10 pounds : average, 7 pounds 10 ounces. Of 26 weighed by Ræder, the heaviest weighed 8, and the lightest $5\frac{1}{2}$ pounds : average, 8 pounds 6 ounces. (See Dr. Gordon's article in the Supplement to the Encyclopedia Britannica.)

In 7,077 cases at the Hospice de la Maternité, at Paris, the average

weight of the children at birth was found to be a little more than 6 pounds; the smallest weighing $1\frac{1}{2}$ pounds, and the heaviest $10\frac{1}{2}$. In a note in Beck's Medical Jurisprudence, it is mentioned that the following results were obtained from 1,541 children who were weighed at birth, and who, with the exception of 8 or 10, appeared to have attained the full term:

3	. . . .	2 pounds and some ounces.
31	. . . .	3 " " "
17	. . . .	4 " " "
308	. . . .	5 " " "
606	. . . .	6 " " "
380	. . . .	7 " " "
100	. . . .	8 " " "
16	. . . .	9 " " "
<hr/>		
1541		

There is recorded in the 3d volume of the Medical and Physical Journal, the case of a child that weighed 17 pounds. The Lancet for December, 1838, contains the account of a child born dead, that weighed 17 pounds 12 ounces. On the other hand, children have been born exceedingly small, and displaying all the phenomena of life. A case occurred in this city, in the practice of Dr. Thomas Boyd, where the child, at the age of 6 weeks, weighed, with all the clothes, but $2\frac{1}{2}$ pounds. He is now living, and an ordinary-sized man. Dr. Wendell, of Brooklyn, informed me of two still more remarkable instances: one where the child, born at the full time, weighed 1 pound 9 ounces; it lived 5 months, and then died of croup. Another, that weighed at birth but 1 pound, and who lived 5 weeks, and died of diarrhœa. The mother of this child gave birth to four children, the largest of whom weighed but 4 pounds.

In twins, the average weight of each is stated to be less than that of single children, although their combined weight is greater. Dr. Clark found the average weight of 12 twins to be 11 pounds a pair; the heaviest weighed 13, and the lightest $8\frac{1}{2}$ pounds. Mr. Burns, however, states that he has known instances in which each twin was rather above than under the usual weight.

The French pound mentioned in the text, contains 9216 Paris grains, while the English avoirdupois pound contains only 8532.5 Paris grains, and one pound avoirdupois contains 435.25 grammes. The smallest weight, therefore, recorded by the author, is 2 pounds

13 ounces and 4 drachms; and the largest, the correctness of which he justly questions, is upwards of 27 pounds avoirdupois. The average of 5 to $5\frac{1}{2}$ pounds is here mentioned as the weight of children at birth; corresponding to a little more than $5\frac{1}{4}$ to nearly 6 pounds. The other experiments in the French hospitals likewise show the weight in French pounds, *poids de marc*; therefore, the average of a little over 6 pounds stated above, in this note, corresponds to something over $6\frac{1}{2}$ pounds avoirdupois. Dr. Dewees mentions, as the result of his experience, that the average weight is a little more than 7 pounds; from which it would appear that children in this country, at birth, are larger than in France. The remark of Dr. Dewees, however, cannot be considered any thing more than an approximation to the truth, for want of the extensive opportunities of observation enjoyed in the French hospitals.

MONSTROSITY.

Note to page 64.

A case of monstrosity is recorded, accompanied with a plate, by Dr. Duane, in the American Journal of the Medical Sciences for February, 1830, caused by an injury which the mother had received from frequent kicks on the abdomen, by her husband. She had previously borne three children, at three successive accouchements, all perfectly formed. The monster caused by these injuries was of the Cyclops order; it uttered no cry, nor did it move its limbs; a feeble inspiration and spasmodic contraction of the muscles of the face were the only symptoms of life it exhibited. "The eye was situated at about the usual commencement of the middle nasal suture; it was oblong; its horizontal diameter about one inch; its perpendicular diameter about half an inch; the conjunctiva extended about one line transversely over the cornea superiorly, and bounded it inferiorly; the cornea had the shape of two circles joined on one side; there were two distinct pupils." "The chest was somewhat distorted. The penis was three quarters of an inch long; the testes, with the scrotum and its raphé, were wanting. The arms were unusually long, hanging down, when the body was suspended, an inch and a half below the knees. The lower extremities were small, bent at the knee, and ankylosed." Dissection revealed a great derangement and confusion of parts; among others, there was no trace of muscles on the abdomen or lower extremities, their place being supplied by adipose matter.

CONGENITAL SMALLPOX.

Note to page 80.

That the fœtus is sometimes infected with smallpox, is a fact established by a number of well authenticated cases. Dr. Pearson has recorded in Duncan's Commentaries, vol. xix., a number of cases of this kind which he has collected from various sources, and he also mentions one which fell under his own notice. The Memoirs of the Lond. Med. Soc., vol. iv., contains an account of a lady who, in the 7th month of her pregnancy, was inoculated and went through the regular smallpox. She was delivered of a dead child, covered with pustules that proved to be variolous, from their having communicated the smallpox to several persons who were inoculated with some of the matter. (See Dissertation on the Pathology of the Human Fluids, by Jacob Dyckman, M. D., N. Y., 1814, p. 186, where reference is made to cases by Bland, Derham, Roberts, Haygarth, Burzerius, Laird, Forbes, Jenner, and others.)

Two instances of the effects of variolous contagion upon the pregnant mother and child, occurred in the practice of Dr. Hosack. (See Observations on Mercury, by J. W. Francis, M. D., Amer. Med. and Philosoph. Register, vol. iv., p. 479.)

The editor also mentions, in a note in Denman's Midwifery, 3d Amer. edit., p. 313, that he has seen smallpox eruptions in a newborn infant, the mother of whom labored under varioloid, which prevailed in New-York in 1823-4.

ERYSIPELAS.

Note to page 101.

Infantile erysipelas is a disease of very rare occurrence in this country, but is more frequently seen in Europe, particularly in public hospitals. The writer has met with but few cases, and those in dispensary practice, some few years since. In these instances there existed a high degree of vascular excitement, attended with evident derangement of the biliary and digestive organs. Where such symptoms clearly exist, the first step in the treatment is to evacuate the bowels by a mercurial purgative, followed by a teaspoonful of castor oil; a soluble state of the bowels and a relaxed condition of the skin should then be preserved by the use of small doses of ipecacuanha combined with calomel, or a solution of acetate of ammonia; and if there be acidity present, the use of bicarbonate of

soda or potas, may be added to the former. In robust children, where there is a high state of excitement, topical depletion will be found to be of great utility. Various methods of effecting this have been recommended. Mr. Brodie and Mr. Lawrence advise extensive incisions, Dr. Babington short incisions or punctures, while Mr. Travers is in the habit of using leeches. When they are used, they ought always to be applied to the healthy skin. Two cases of fatal hemorrhage, where free incisions were used, are reported in one of the English journals a few years since, occurring in infants from the inattention of the nurse. When there exists great tension, which it is necessary to relieve promptly, free incisions would probably be the proper manner of accomplishing it; and the ill consequences which might arise may be guarded against by careful attention on the part of the nurse.

In this disease the most opposite remedies have been recommended. While depleting means are used by some, stimulants are employed by others. Mr. Burns recommends ammonia in large doses, Dr. Underwood bark and aromatic confection; but the propriety of these remedies may well be doubted, when there exists any vascular excitement. Do not these opposite opinions arise from too limited a view of the nature of the disease, and from not considering it as consisting of different stages—that of violent excitement and corresponding collapse? These changes often occur suddenly, and at very uncertain intervals, and on this account may have appeared to require remedies of a very different nature, and may indeed demand some change of treatment in a very short space of time; the disease, therefore, needs the closest discrimination in the adaptation of therapeutic agents to the existing constitutional symptoms.

Desault has recommended emetics, and Dr. Eberle thinks that emetic doses of ipecacuanha would often prove serviceable in the early stages of infantile erysipelas, from having seen active vomiting produced by the use of calomel and ipecacuanha, on the third day of the disease, followed by an immediate amendment.

As a local remedy, mercurial ointment has been used with success: it should be applied to the whole of the inflamed part, and on a portion of the surrounding skin; and in case of vesication, the vesicles should be opened and the fluid discharged before its application. In obstinate cases, blisters are of the greatest efficacy when applied to the margin of the inflammation. They appear to operate by changing the action of the bloodvessels, and also probably by depleting from the capillaries in inflamed portions of the skin. In a

case attended by the writer, the progress of the inflammation, which was on the abdomen, was speedily arrested by applying a long strip of blistering ointment along the edge of the sound skin.

MEASLES.

Note to page 102.

This disease is very much modified during its prevalence as an epidemic, by the peculiarity of the constitution of the individual attacked; for it often exists in every variety and degree of intensity, among children exposed to the same influence. The state of the atmosphere, and the season of the year, also controls its development in a very remarkable manner, the symptoms being always more mild in summer, and more violent in the cold and changeable weather in winter.

It is often nothing more than a disease of simple excitement, with catarrhal symptoms—which, indeed, are its invariable attendants—and mild aperients and demulcents, with pediluvia, will for the most part be all the treatment necessary. Infusions of flaxseed, slippery-elm, or barley water, will be found sufficient to manage this disease in its mild form.

Still, as the slight excitement may increase, no one being able to foretel the continuance of the same condition, the physician should be prepared to meet it in all its forms, whether of increased vascular excitement, or of local inflammation, or congestion. When the former of these conditions arises, the use of diaphoretic medicines, combined with an expectorant, are clearly indicated. Syrup of ipecacuanha, either alone or combined with a solution of extract of liquorice, or syrup of tolu, is a good combination for fulfilling this indication. As a general rule, ipecacuanha is to be preferred to antimony, in very young children; for the debilitating effects of the latter are sometimes truly alarming, and have even been fatal. Two instances of fatal prostration in young infants have come to my knowledge, which ensued immediately upon the administration of a small quantity of antimonial wine. Still, great benefit is derived from the cautious use of very minute doses of this medicine, in high excitement occurring in robust children. A grain of tartar emetic in a half pint of water, of which a teaspoonful may be given once in two, three, or four hours, will be the best method of ascertaining the effect of this medicine on an infant, and it may be increased or diminished, as the child is capable of bearing its action.

Upon the appearance of decidedly inflammatory symptoms in any

of the viscera, sanguineous depletion must be adopted, to be proportioned to the degree of inflammation and constitutional vigor of the child. There is scarcely a disease which requires the loss of blood more than measles, when the lungs are inflamed, and it is the most effectual means of preventing the troublesome and often serious cough, which is one of the sequela of this affection. A hoarseness contracted early in life often continues to adult age, and the foundation of phthisis frequently has its commencement in an attack of measles.

In slight cases of inflammation, or should there rest any obscurity on the complication, producing a doubt as to the propriety of general bloodletting, local bleeding will be both safe and useful. A large warm poultice may then be applied to the chest. Emetics are often highly necessary to relieve the child from the accumulation of the serous fluid so copiously effused in the air-passages, when the lungs are inflamed or congested. Throughout the disease the bowels should be kept open by the use of mild aperients.

The brain is sometimes seriously affected, showing itself in a drowsiness, from which it is difficult to arouse the patient, and the quantity of mucus closing the nostrils produces a kind of stertorous breathing; an open condition of the bowels, stimulating baths to the lower extremities, will for the most part be sufficient for the relief of this symptom. If, however, there should appear much heat about the head, leeches will be necessary, followed by a blister between the shoulders.

When there exists any visceral inflammation, blisters are undoubtedly of great efficacy, after the arterial action is in some degree subdued. In young children, however, they ought to be left on but a short time, and never suffered to remain until the part is blistered, as very obstinate ulcers have been the effect of this practice. The skin should be examined from time to time, by raising the corner of the plaster; and if a considerable redness be observed, the blister must then be removed, and the part dressed with simple cerate, which will be sufficient to raise the cuticle. I have never seen an ill-conditioned ulcer produced where these precautions were taken.

The cough is often exceedingly annoying after the inflammatory symptoms have been removed; this is best treated by opiates, and the acetate of morphine combined with syrup of squills is one of the best forms in which they can be administered.

It sometimes happens that the eruption is slow in appearing; the face is pale and shrunk, and a difficulty of respiration or profound

stupor exist. In this congestive form every effort should be made to restore action to the circulating system; and stimulating frictions, warm baths, and blisters freely used to effect this object; while local bleeding from the congested part may be necessary. The same means ought likewise to be resorted to in cases of retrocession of the eruption. In addition to these, warm and stimulating drinks are recommended by Armstrong, Eberle, and others; and camphor or ammonia, suspended in a mucilaginous fluid, are also advised by them.

SCARLET FEVER.

Note to page 106.

The author has referred to the various phlegmasiæ for details of the proper treatment of this disease when complicated with inflammation of different organs, and from which alone it acquires its violent and fatal symptoms, with the remark that inflammation of the throat is of all others the complication the most common. Upon consulting the history of the various phlegmasiæ, and particularly the chapter on inflammation of the throat, it will, I think, appear evident that a knowledge of scarlatina, as it has of late appeared in this country, can scarcely be obtained from these sources. It will therefore be made the subject of a few observations.

It is a remark of Dr. Armstrong, in his valuable dissertation on this subject, that, so far as his observation extended, inflammation of the throat constantly attended the cutaneous affection; and I think, upon close examination, it will always be found to exist in connexion with the eruption, although sometimes indeed in a very slight degree. Not only is the throat inflamed, but the inflammation extends to the other parts of the mucous surface, but lessening as this membrane becomes more removed from the influence of the external air; the membrane lining the cavity of the mouth, fauces, pharynx, and trachea—the latter being very remarkably affected in infants—are, in connexion with the skin and cellular tissue beneath it, as is evident from the general tumefaction of the body, the seat of the disease. All anatomical facts go to the establishment of the fact, now generally admitted, of the identity of the cutaneous and mucous surfaces. M. Billard has given a striking illustration of this, in recording the simultaneous congestion of the skin and mucous membrane in nearly two hundred infants; clearly proving these surfaces to be influenced by the same physiological laws, and thus establishing their mutual identity. The disposition of that portion of the digestive passages which is exposed to the influence of the external air to

become inflamed more readily and in a peculiar manner, has also been noticed by the author.

Scarlatina is more especially manifested in the external and internal dermoid surfaces; and besides the probable cause of its appearance, as above suggested, in the upper part of the digestive mucous membrane, there exists another reason which will explain, I think, the violent inflammation of the tonsils. These organs are not strictly glands, but are the continuation of the mucous membrane, and are nothing more than a congeries of mucous follicles, thus containing a great extent of mucous surface in a small compass; hence the greater inflammation, secretion, and tumefaction, analogous to the more abundant eruption in the folds of the skin about the joints.

In addition to the reasons already assigned for the more frequent appearance of the inflammation in the fauces, there appears to be a different predisposition to the disease in different portions of the mucous surface at certain periods of life; and in young infants the trachea is the part most seriously affected. In them the secretion from the mucous membrane of the trachea is often immense, and the danger of suffocation imminent, from the viscid mucus clogging the air-passages to the lungs, and also by obstructing the free flow of blood from the brain, and thus producing a congestion of that organ.

That the disorder exists internally, is evident from the gastropulmonary mucous membrane pouring out the abundant secretion so common in violent cases of the disease, even where autopsic examination reveals little or no capillary injection or ulceration in the mucous membrane of the stomach and intestines.

Dissections show that although marks of inflammation have often been found in the stomach and intestines, sufficient to prove the extension of the inflammation throughout the mucous surface, yet their occurrence is much less frequent in those parts, in infants, than in the fauces, œsophagus, trachea and lungs: and although effusion is almost always found in the brain in those children who have died from scarlatina,—the closing scene for the most part being attended with symptoms of congestion and effusion,—yet the greatest functional and organic derangement is more frequently found to exist in the fauces and trachea. Whether the brain is implicated or not, the throat and trachea always manifest inflammation and often great ulceration, particularly where depletion was neglected at the commencement of the disease. But in an affection arising, as this does, from a specific contagion, and in which the whole capillary system appears to be in a state of erethism, and often, upon a sudden inva-

sion, manifesting itself only in a prostration of nervous energy, it is an error to insist upon localizing it, and considering certain organs and tissues as its exclusive seat. The older physicians, close observers of morbid phenomena as they appear during life, but less versed it is true in special anatomy—which it must be admitted will sometimes limit our view of diseases to the part alone which retains the traces of sanguineous turgescence or disorganization after death—termed such diseases “*morbi totius substantiæ*.”

After a careful examination of the writings of the various authors on this disease, and from the experience afforded by the late epidemics, the conclusion is irresistible as to its specific and contagious character. I know that the fact of its contagiousness has been denied, and the opposite opinion ably advocated by respectable authority. But there is a tendency to extremes on all subjects, and to lose sight of facts of daily occurrence when the mind is engaged in generalizing, and when any important discovery is made which promises to elucidate that which before was obscure, or by assigning as a cause a gratuitously-assumed principle. To what else can be attributed the opinion held by some physiologists, that the syphilitic disease is not contagious?

Scarlet fever prevails at all seasons, but the winter and spring appear to be most favorable to its development and dissemination. Great irregularity exists as to the times of its appearance and the severity of its attack, but the peculiarity of atmosphere that exercises this influence is unknown. For the most part, it prevails as an epidemic, and assumes different degrees of intensity, from the simple rash on the skin, or efflorescence of the fauces, of a very limited duration, to the most malignant form, with all its train of frightful and fatal symptoms. No age is exempt from the scourge; it however prevails mostly among children; and in the epidemic which prevailed in the city of New York in 1837, in 579 deaths from this disease, 125 were between the age of 1 and 2 years, and 72 under 1 year.

Authors have made three species of this disease; but as they often pass into each other, and the line of separation cannot always be distinctly marked during the prevalence of an epidemic,—the *S. simplex* sometimes continuing a day with great mildness, and of a sudden assuming the form of the anginose variety, and the *S. anginosa* in its turn presenting every variety, from a red and slightly-tumefied appearance of the fauces, palate, tonsils and uvula, to the ulceration and sloughing of these parts and the congestion of the various viscera,—it appears to be of more practical importance to view it as a

disease of different degrees of severity, and to be ready to meet it under all its forms, be the attack of ever so mild a character. To this, the most usual manner of its appearance, may be added the congestive form of its invasion; distinguished by the paleness of the surface and the want of reaction.

It has been already remarked that all parts of the mucous tissue are not equally disposed to be affected with the inflammation produced by this disease; and the various local congestions, either of the brain, stomach, fauces, trachea, or lungs, will of course require, together with other complications, in many cases, a difference of treatment, and will call into action the judgment of the physician; and indeed there does not exist a disease where there is greater difficulty in laying down a precise course of treatment, and in which the exercise of a sound judgment is more necessary, than in a disease so greatly complicated as scarlet fever. There has been generally too indiscriminate a reliance on one course of treatment, whatever be the stage or symptoms of the disease.

Upon the treatment of this disease, a practical writer in Dr. Doane's edition of Good's Study of Medicine, makes the following truly judicious remarks: "The treatment must be regulated by many concurring circumstances; in its simplest form, it is almost supererogation to interpose art, where nature is so judicious in her operations; in other cases, mild aperients, sudorifics, simplicity in diet, and attention to cleanliness, may often suffice. In its complex form, with sore throat, our indications are of a more discriminating order, and challenge our severest judgments and most effective capabilities. A difference in pathological opinions must necessarily lead to a corresponding difference in our curative means; as, for instance, whether we deem the existing state of disordered action to depend mainly upon the asthenic or sthenic diathesis, upon debility or increased energy. Too exclusive an adherence to either belief has been a prolific source of evil; the practice of viewing scarlatina as a disease of debility, has induced many to recommend early bark, wine, alcohol, and the diffusible stimuli, with cordial nourishment, after the method of the older alexipharmic prescribers, and to deprecate all antiphlogistic medicines. After this manner, in order to support the strength, have many epidemical or pestilential disorders at various periods been treated; I need not add with what pernicious results. On the other hand, without due consideration of the specific character of scarlet fever, of the laws which regulate febrile infection, and of the uniform influence which diseases of such origin have in their

tendency to induce a greater expenditure of the vital powers, other prescribers have urged, even in the advanced state of the complaint, the antiphlogistic method, by copious bleedings, emetics, drastics, cold effusion, and other potent agents, on the ground that all the morbid phenomena depended upon an active inflammatory diathesis. Of the consequences of such a pathology, we have too many fatal examples."

While the disease is simple, a mild, antiphlogistic treatment will be all that will be required. But however mild the disease may at first appear, it should be carefully watched, and upon the appearance of any increase of inflammatory action about the throat, or of any symptoms of oppression, as the progress of the disease is often rapid, more active measures will become necessary; and regarding the disease as affecting principally the capillary system, an emetic will be found the proper remedy to break up this general and deeply-rooted affection, by its powerful action on that system; the effect of the operation of which is to prevent congestion, by the restoration of the secretory functions of the various organs. Authors in every country, who have written on this disease, bear testimony to the powerful efficacy of emetics at the commencement. They may, therefore, be regarded as a most valuable remedy. This should be followed by a mild purgative and warm bath; and if there be much febrile excitement, it must be met by the use of diaphoretics, such as small doses of ipecacuanha, together with demulcent drinks and tepid effusion. The cold effusions of Dr. Currie appear only applicable in the simple form of the disease, where there is little or no local inflammation. The bowels should be kept open by mild aperients, or injections.

If the febrile action continue, or symptoms of cerebral or other local congestion, or severe inflammation of the fauces ensue, blood must be taken, either with the lancet, or by leeches applied to the affected part, according to the urgency of the symptoms, and the condition of the patient. Every symptom shows a high state of inflammatory action. The skin is intensely inflamed, the fauces are in the same condition, the tonsils are loaded with blood and excessively tumefied, and the occasional formation of abscesses in the joints also prove the previous existence of inflammation in these parts. With all these evidences of inflammation, bloodletting in some form, then, appears to be the most rational, as it is the most efficient, remedy; and I must bear testimony to the efficacy of this remedy, both general and local, in this stage of the disease. The application

of leeches to the throat is indispensable, and will often be sufficient to relieve the congestion of these parts, particularly if followed by a poultice. In severe cases, reliance ought not to be placed on leeches alone, but general bloodletting must be used early in the disease; for it is the deferring of this remedy a few hours beyond its proper time, that has brought the remedy into disrepute. Blisters to the throat have been highly recommended by Dr. Rush and others, but I have not found much advantage from their use.

If there be much prostration, warm fomentations, stimulating cataplasms, or dry cups, should be applied over the congested parts, and small doses of calomel will be found useful in cases of local congestion. An early and decided bleeding, however, on the appearance of violent inflammatory symptoms of the throat, followed by mercurial purgatives, are necessary to prevent the progress of the inflammation; and it is surprising what quantity of purgative or emetic medicine will sometimes be required to produce an effect, in consequence of the large quantity of viscid mucus which coats the stomach and bowels. It is this method of treatment, adopted with energy, which is found to be the most efficacious in preventing the appearance of those symptoms which produce the condition denominated *scarlatina maligna*, which is but a stage of collapse—an effect of previous excitement of very uncertain duration.

Whenever this course of treatment is adopted, great alleviation often follows; but when it has been neglected, the result has generally been a fatal termination, although the progress of the disease, in some instances, may have been slow.

The head is sometimes excessively heated in this stage of the disease, and the eyes morbidly sensible to the light; under this condition, blood should be abstracted locally after general depletion, cold applied to the head, and purgatives freely given, while revulsions are used to the lower extremities; they should not, however, be highly stimulating while the excitement is high.

Scarlatina maligna would appear, from the descriptions usually given of it, to be a form of disease always distinct from all others,—or a variety which can at once be recognised as possessing some characters peculiar to itself: this is indeed sometimes the case; but whoever has had much experience in our late epidemics, must have noticed in some instances cases of the most malignant and fatal character, occurring in the midst of every shade of the disease, and perhaps commencing with symptoms so mild as scarcely to excite alarm.

If the appearance of these symptoms be sudden, they show themselves in a peculiarly variable manner—the skin possesses no uniformity of heat—the pulse may be feeble or it may be active—the eruption may appear, recede, and reappear, without confining itself to any particular part of the body; but the interior of the throat will generally be found ulcerated, and the parts surrounding the ulcer of a deep modena hue, the tongue is covered with a dark fur, and the breath is fœtid—a quantity of viscid mucus clogs the air-passages;—these, together with symptoms of congestion of the brain, will mark with sufficient distinctness a condition which may almost be considered as necessarily fatal.

Nearly the same symptoms arise after the disease has been considerably prolonged; when this is the case, the throat externally is often prodigiously swelled. There is in this stage of the disease a remarkable pungency of the skin, and a dark hue of the eruption.

When these symptoms appear, either immediately on the invasion of the disease, or as a sequela of the preceding inflammation, it may become necessary to support the energy of the circulation by the use of an infusion of snake-root, (*Aristolochia Serpentaria*,) or perhaps on some occasions by a little wine whey; but bark, wine, cordials, and other stimulants, recommended by some practitioners, would scarcely have been considered judicious practice during our late epidemics. The effect of these, given at first in very small quantities, should be carefully watched, and if they produce a diaphoretic effect, may with safety be continued and their quantity increased.

In order to remove the sloughs and to produce a disposition on the part of the ulcers to heal, by changing the character of the inflammation, various stimulating and astringent applications have been recommended, such as diluted muriatic acid, sulphuric acid, tincture of bark, solution of alum, tincture of myrrh or capsicum, or chloride of soda, applied to the affected part, by means of a swab. A weak solution of nitric acid has been found very useful. Emetics are here highly important, and indeed necessary to cleanse the throat, and to remove the viscid secretion that often accumulates in the respiratory passages. The bowels ought to be kept soluble by mild laxatives of rhubarb and soda, or by enemata. Should it still appear necessary to deplete, durgics, as judiciously recommended by Dr. Withers, will be found a safe method of effecting this object; and the subcarbonate or acetate of potass may be used.

The congestive form of invasion may be known by the sudden

seizure, and the general oppression of the system; the skin is excessively pale, and I have heard nurses call it the *white* scarlet fever. Where no reaction occurs, and the child sinks at once, it is not until after death that the eruption for the first time appears; while during life the entire absence of this distinctive mark of the disease might easily lead to an error in the diagnosis, were it not that the prevailing epidemic gave an almost certain intimation of its nature.

When it appears in this form, all the means in our power must be used to restore an equilibrium to the circulation, and the warm bath, rendered stimulating by the addition of salt, is one of the most efficient means for this purpose. The surface of the body may be rubbed with flannels moistened with some powerful stimulant, and diluted aqua ammoniæ is probably the best that can be used; and, indeed, endermic stimulation in cases of internal congestion is far more efficacious than the internal administration of stimulants; for although the latter may produce reaction, yet if they do not promptly effect it, they doubtless increase the existing congestion from their continually stimulating influence. When, however, it is deemed advisable to have recourse to internal stimulants, wine whey, or a small quantity of tincture of camphor, will be found the best. Blisters should at the same time be applied to the legs. Bleeding may in some cases be used, but with great caution in infants; for it must be borne in mind that congestion is an evidence of great loss of vital energy, and that the abstraction of blood might be quickly fatal. The bowels ought also to be opened with a full dose of calomel, promoting its operation by enemata.

Dr. Charles A. Lee, of this city, has obligingly favored me at my request with the following results of his numerous autopsic examinations of scarlet fever:

"I regard the local inflammation which attends scarlatina as a specific affection, identical with the diphtheritis of Bretonneau and other French writers, and characterized chiefly by a membranous exudation on the surface of the mucous membrane of the mouth and fauces. We see this tendency, also, after the application of a blister, and indeed wherever the cuticle has been removed by any cause whatever. We sometimes, though rarely, find it extending down the trachea and bronchiæ, giving rise to all the symptoms that attend an attack of croup.

"It is however important, when speaking of scarlatina, to keep in mind the two very different forms which it assumes; namely, the *anginose* or purely inflammatory, and the malignant or *congestive*

form, in which we have a frequent, feeble pulse, cold extremities, extreme prostration, and great determination of blood to the head. In the latter, patients often die after a short illness, sometimes before reaction is established, and in such cases the scalpel reveals nothing. The citadel of life has been invaded by an invisible foe, and its forces have succumbed, leaving behind no vestiges of the attack.

"In treating of the Pathology of Scarlet Fever, my remarks will naturally fall under two divisions, namely, 1, Lesions of the Solids; and 2, Lesions of the Fluids.

"1. *Lesions of the Solids.*—In scarlatina, there is hyperæmia of the mucous membranes generally, and of the mouth and fauces in particular; which constantly tends to terminate, either by a membranous deposit of coagulable lymph, or by ulceration; and the ulcerative process, when once established in any part, is very apt to extend its ravages to the neighboring parts of analogous structure. This inflammation, we have reason to believe, is of a specific character, depending, probably, on the peculiar impression made on the nervous system by the epidemic influence. At a very early period in the disease, indeed, before any constitutional symptoms appear, we shall perceive, on examining the fauces, that the vessels of the mucous membrane are highly injected, and upon the surface of the tonsils and soft palate, gray patches of lymph, often mistaken for ulcers, which increase in extent as the disease progresses. Preceding, or accompanying this appearance, we sometimes see small vesicles of a purple or whitish color; and these are sometimes found also upon the skin. In severe cases the fauces assume a deep modena red, or purple suffusion, and when this is the case, ulceration is sure to follow. Flocculi of lymph appear scattered over the surface in irregular patches, resembling in appearance the purulent secretion of an ulcer, from which they can at first scarcely be distinguished. In a short time, however, unless removed by gargling, or some other means, these patches assume a dark or black color, attended with a peculiarly oppressive fætor. On removing them, the surface beneath appears red, spongy, and somewhat swollen. The tonsils are more or less enlarged from the commencement, and in severe cases are almost uniformly the seat of extensive ulceration.

"*Autopsic examination* by no means reveals the same appearances. In many cases where I expected to find extensive local ravages, there were scarcely any marks of disease present; and in others, where the constitutional symptoms were comparatively light, I have found the most frightful vestiges of disease. You will doubt-

less recollect the case of the child in Amos-street, whose dissection you witnessed a short time since. In this case the disease assumed a very mild form, yielding kindly to medicine. In a few days the patient was apparently well, with the exception of a slight cough, and the physician in attendance ceased his visits. In about a fortnight afterwards, he was again called in, and found her laboring under an incessant cough of a croupy character, though at this time she was playing about the house. In two or three days afterwards, she died from suffocation, during a coughing fit. On examination, I found a great portion of the larynx destroyed by ulceration, and the fauces were completely honey-combed. Numerous perforations existed in the tonsils, palate, &c., of various sizes, while the mucous lining of the trachea was either softened, or abraded, through its whole extent. There was a vast collection of frothy, muco-purulent matter collected in the larynx and trachea, which doubtless was the cause of the suffocation. The other organs were healthy.

"In another case, which happened not long after, you also was present at the examination, and can bear testimony to the great difference in the appearances, on dissection, from those above given. The patient was a boy, five years of age: at an early period there was considerable redness about the fauces, and the tonsils were somewhat swollen. The breath was hot and offensive, and the pulse ranged from 120 to 140. There was extreme restlessness and jactitation throughout the whole course of the disease, with frequent moaning and screaming, a wild expression of the eyes, irregular and often labored respiration, temperature of the body very unequal, head generally hot, and extremities cold. As the disease progressed, his mouth and lips became encrusted with a dark brown sordes; the tongue was swollen, fiery red, and cracked; the throat became filled with a thick, glutinous, tenacious mucus; the stomach was extremely irritable, and the epigastrium tender on pressure. There was more or less delirium throughout the whole sickness. He sunk into a stupor, and died on the sixth day from the attack.

"*Autopsy eight hours after death.*—Body emaciated; a few black spots on the posterior part of the body; a yellowish mucus discharging from the mouth and nose, in considerable quantity. The lungs were found healthy, and remarkably free from blood; no marks of inflammation about them; and on cutting into them, we found but very slight effusion into the air-cells. The mucous surface of the trachea and bronchia was covered with a white mucus, which, on being removed, the membrane presented a healthy appearance.

The liver was healthy; the gall-bladder full of bile; the heart natural; and the pericardium contained the usual quantity of serum. There was no ulceration about the fauces, tonsils, or palate, and the whole lining membrane of the mouth was perfectly healthy. It is proper, perhaps, to remark, that this patient had been very freely bled and leeches.

“ We however generally find in this disease ulceration about the glottis and tonsils, of greater or less extent, though the hyperæmiæ of the mucous membrane, so constant during life, is very apt to disappear after death. The same is also true of the vascularity of the mucous coat of the stomach, and small intestines. The air-passages very often present pathological alterations. We sometimes see merely a vascularity of the lining membrane, at other times a thickening, and occasionally ulceration. It is not uncommon to find the trachea and bronchæ filled with a thick, tenacious matter, of a mucopurulent character. In a few cases, I have discovered marks of inflammation about the lungs and pleura; but this is by no means of frequent occurrence, and, when present, are to be viewed as an accidental complication. Where leeching and venesection have not been practised, the lungs will frequently be seen gorged with blood. In those cases, attended with an acrid sanious discharge from the nostrils, and where there is a tendency to the formation of a glutinous, brown sordes on the mouth and teeth, I have invariably found more or less extensive marks of disease about the brain; and the former symptom, particularly, I have been led to consider as a highly dangerous one, from its indicating, with great certainty, such a complication. In these cases, the vessels of the brain will be found injected, particularly of the membranes, and there will be found an effusion of turbid lymph between the arachnoid and pia mater, and also more or less serum in the ventricles. In the highly congestive cases, where death has speedily resulted, we find few marks of disease about the throat; but the bloodvessels of the larger organs, particularly the brain, lungs, and liver, will be distended with dark-colored blood. Dr. Armstrong, in his work on scarlet fever, remarks, ‘From the examination of several bodies after death, I am warranted in affirming that the brain, the liver, the stomach, the intestines, and the lungs are the parts most often inflamed, and that the inflammation in these parts is generally the cause of death, together with the affection of the throat.’ But I have examined many cases where death could not be said to have resulted from either of these causes, for in two of them the patient died within nine hours of the attack,

and nothing but congestion of the larger organs could be discovered. In some of these cases of congestive scarlet fever, the symptoms bear a striking resemblance to those produced by the narcotic poisons; there is the same abolition of sense, and the power of motion, frequently combined with convulsions; a contracted pupil; and labored, or even stertorous respiration. The appearances on dissection are also the same. Hence, I have been led to conclude that the contagious principle occasioning the disease is a specific virus, of a gaseous nature, which, being introduced into the system through the medium of the bloodvessels of the lungs, acts, as narcotics also do, either upon the brain, or spinal marrow, or both. These notions are in a great degree *assumptions*, it is true; but if any one can invent a more satisfactory hypothesis, I should be very glad to adopt it.

“*Lesions of the Fluids.*—With respect to lesions of the fluids in scarlet fever, so little progress has hitherto been made in animal chemistry, that but little can be said with any degree of certainty. You are doubtless acquainted with *Naumann's** hypothesis, which supposes that some change is wrought by the epidemic influence upon the properties of the blood, rendering its albuminous constituents incapable of being held in solution by the serum, in consequence of which, the former exude upon the surface of the mucous membranes, in form of a deposit, as we see about the throat and fauces in this disease. Again, it is the opinion of *Donné*, that in scarlet fever the secretions become highly acid; and, as *Geddings* remarks, if we admit as valid the opinion of *Raspail*, that fibrine is merely albumen coagulated by an acid, we thus acquire a reason why the serum loses its power of holding the albumen in a state of solution. But however this may be, there is most obviously a deterioration of the secretory and nutritive functions, owing, doubtless, to an impairment of the nervous energy. There is, consequently, a change in the constituents of the blood, either as to quantity or quality, or both, and a derangement of the vital forces, which renders them incapable of speedily repairing such lesions as are the result of the inflammatory engorgement, or even of throwing off the disease, when violent in its attack. Owing to this same impairment of nervous power, there is a strong tendency to dissolution, both in the solids and fluids, manifested both by the rapid changes which occur after death, as well as during life.

“The above remarks apply to scarlet fever at every age.”

* *Handbuch der Medicinischen Klinik.*

On the subject of dropsical affections occurring after scarlatina, Dr. Stark of Edinburgh makes some very judicious observations. (See Amer. Jour. Med. Scien., vol. xix., p. 507.)

He remarks that they are more frequent during the months of October, November, December, and January, than afterwards; generally a fortnight after the disappearance of the eruption; and sometimes very suddenly, without any previous complaint. In every instance where the urine was examined, it was found coagulable by heat.

He considers cold applied to the surface of the body in some way or other as the immediate cause of these dropsical symptoms. There is an increased vascular action in the cutaneous system to supply the loss of the cuticle which occurs in this disease; but, from the want of tone in the larger vessels, the surface of the body is easily chilled, and the blood circulating there is thrown on the internal organs; and the kidneys are the first to suffer; which, from their weakened condition, undergo a disordered action and a suspension of secretion. This is proved by "several recorded dissections of persons who have died from this disease."

"In all cases," says he, "excepting the very mildest, I bled to a greater or less extent, in proportion to the severity of the symptoms, and the relief experienced from it. Wherever it was practicable, or the parents would allow it, bloodletting from the vein in the arm was preferred, because the symptoms were much sooner relieved by such a practice, and more effectually than when leeches were applied to the loins or other parts of the body. When, however, this was impracticable, or where the child was under two years of age, leeches were used, but always in such numbers as to cut short the disease as soon as possible, and not trust to the removal of the requisite quantity of blood by subsequent fomentation; though these were also occasionally employed. In all the severe cases, the safest and most certain mode of relieving all the urgent symptoms, was to carry the bloodletting to such an extent as to produce a marked action on the pulse." Only one case out of fifteen cases of dropsical sequelæ died, and in this one the parents would not allow of bleeding either by the lancet or by leeches. In addition to this, the doctor prescribes *liquor ammoniæ acetatis* where the urine is entirely suppressed. In mild cases, purgatives, antimonials, *liquor ammoniæ acetatis*, and warm bath removed all the symptoms.

The blood drawn in these cases usually presented a buffed appearance, and was occasionally cupped.

In support of these views, Dr. R. K. Hoffman states, that in the only case that occurred to him of this dropsical affection that was fatal, fibrin was found covering the surface of the liver and pleura, which had not yet formed adhesions, but could be peeled off with the greatest ease.

ACARUS SCABEI, OR ITCH INSECT.

Note to page 116.

No doubt now exists of the acarus being an attendant on the itch, from experiments a few years since at the Hôpital St.-Louis, in Paris.

The size of the insect is about that of the mark which would be left by the pricking of the finest needle.

"The acarus scabei, seen through the microscope, presents the form of a tortoise, a shining surface, more transparent in the centre than at the circumference, of a white color. Its other shades would appear to be the result of the division of luminous rays passing through the lens. The head, which may be considered as a perfect retracting sucker, is provided at each side with two articulated feet, terminating at the tarsus, in a funnel-shaped prolongation. The insect is armed with four additional feet, longer than the former, but without the funnel-shaped appendage; this articulation is not at the sides like those of the horse acarus, but underneath the belly; on the back is perceived a number of eccentric lines at short intervals, and having the appearance of joints; the belly presents several dark-colored spots; the body and legs seemed furnished with a quantity of hair of unequal length." (Raspail, as quoted by the Lancet, October, 1834.)

VACCINIA.

Note to page 121.

The source whence the information contained in the text relative to the proportionate mortality of smallpox in this country is taken, is probably the able report of the Committee of the Philadelphia Medical Society, appointed to collect facts in relation to the smallpox, which prevailed in that city in the year 1827.

There appear to have been about two hundred and thirty-five cases of smallpox reported to the board of health, and one hundred deaths from the disease in the same year: the mortality is therefore not so great as stated by the author.

From this report, the result of a mass of evidence accumulated

from a number of highly respectable sources, the powerfully protecting influence of vaccination is placed beyond a doubt; for it appears that but one death from smallpox after vaccination occurred in Philadelphia in 1827, among eighty thousand vaccinated persons, during the prevalence of a malignant and mortal smallpox, while several persons lost their lives from it after they had already gone through the disease. (See American Jour. Med. Sciences, 1828.)

APHTHÆ.

Note to page 179.

Practical writers, (Evanson and Maunsell, and others,) observe that there is a remarkable absence of all constitutional symptoms in young infants in this affection, even when there exists much gastrointestinal inflammation, but about the time of dentition the febrile action becomes very evident. In severe affections, the bowels are greatly disordered, and the stools are thin and offensive, and without any bile. In the treatment of this disease, the first and most obvious indication is to attend to the diet and regimen, as it occurs mostly in those that are badly nourished, and that are exposed to the influence of impure air. When the mucous membrane of the digestive passages does not exhibit any evidences of a phlogosed condition, mild aperients, as magnesia and rhubarb, or castor oil, have sometimes removed an attack of aphthæ. Emetics have been highly recommended by the writers alluded to above, to free the stomach from the morbid matters which may have been swallowed, and which become the source of irritation; they should of course be given with the caution above mentioned. Where there is evidence of inflammatory action in the bowels, and if the discharges are streaked with blood, the use of purgatives should be avoided; a flaxseed poultice should then be applied to the abdomen. Anodynes are often very serviceable when there is much restlessness, and Dover's powder will be the most efficacious, combined with prepared chalk, when there is much diarrhœa present. Drs. Evanson and Maunsell advise ammonia as the best stimulant, where there exists great prostration; being careful to avoid the error of mistaking the absence of fever for the sinking of gangrene. Sulphate and tannate of quinine have been recommended when tonics are indicated, and iodine has been used with evident advantage in some protracted cases.

As local applications, Dr. Dewees uses Armenian bole mixed with sugar, both finely powdered; or a decoction of half an ounce of pow-

dered bark, boiled for half an hour in half a pint of water, a teaspoonful of which is to be put in the child's mouth every hour or two. Borax is an excellent and popular remedy; it may be applied either in the form of powder mixed with sugar, or in solution, in the proportion of a drachm in two ounces of water. In very obstinate cases, sulphate of copper, or nitrate of silver have been used, and have quickly changed the character of the ulcers.

GANGRENE OF THE MOUTH.

Note to page 192.

M. Marjolin, in the article "*Gangrene de la bouche*," in the *Dictionnaire de Médecine*, recommends muriatic acid and honey, muriate of soda, and caustic potash, which he says have been employed with success. MM. Jadelot and Guersent have also successfully used the actual cautery. Dr. Burns advises chloride of lime, nitrate of silver, carrot or yeast poultice; nitric acid as a local application has likewise been used with advantage.

The application, however, which has succeeded beyond all comparison, is the sulphate of copper, and the rapidity of the cure under its use is in some cases surprising. It is far preferable to the use of actual cautery; it can be applied with the greatest facility to every portion of the diseased surface; care and attention are requisite to see that every part of the diseased part is brought under the influence of the application, as a failure might otherwise ensue. Simple ulcerations and small gangrenes quickly yield to the use of this means, and an amendment is evident from the first application. The solution should be made strong, as in the formula at the end of the appendix. (See Dr. Coates's article in *N. A. Med. and Surg. Journal*, 1826.)

EDENTULA.

Note to page 203.

M. Baumes mentions the case of a soldier who never had any teeth from his birth. Dr. Fitch, in his system of dental surgery, gives an instance of a gentleman in whom the bicuspid teeth of the lower jaw never appeared, and also of a young lady who never had the lateral incisores of the upper jaw; and, what is more surprising, that of a family of whom several individuals never had any teeth. This affection was in the last mentioned instance hereditary, and had been remarked for several generations.

TEETHING.

Note to page 210.

The disturbances produced by dentition are in a healthy child often so slight as to require little or no attention. The gums will, however, sometimes become greatly swelled, the mouth hot, and the secretion of saliva suspended; under these circumstances, there is nothing which will give more speedy relief to the inflamed and painful gums than a free incision through them to the teeth. If there exist any disease, although the teeth may not be the cause of the existing disturbance in the system, yet the pressure they make on the nerves in the socket, and the tension of the membrane covering the crown of the teeth, are sources of great irritation in the delicate and susceptible system of infants; and may thus aggravate the various diseases with which they may be affected; for it can hardly be doubted that many diseases which at another period of life would have terminated favorably, have frequently been fatal in the irritable state attending the period of dentition: and that such is the case, appears evident from the great mortality among children while teething. On this account, the gums ought freely to be divided in diseases of infancy, should there even exist no actual swelling, but simply an expansion of the gum over the teeth.

The objections urged against this operation, except when the gums are actually inflamed, are—that the physician may endanger his reputation should the tooth not appear—that the cicatrix left on the healing of the gum is much harder than the surrounding gum, and that the incision may degenerate into an ulcer. Now if the tooth be suspected to be a source of aggravation to the existing disease, and it be deemed necessary by the physician to cut down to it, even though it be still deeply imbedded, in order to liberate it from its investing membrane, the nature and object of the operation can easily be explained to the parents. With regard to the formation of a cicatrix on the healing of the incision, this would rather promote than retard the passage of the tooth, for it is well known that a cicatrix is much sooner removed by absorption than the surrounding parts. If an ulcer appear, it will be speedily removed by a wash made with the decoction of *Coptis trifoliata*, alum, or, when severe, by the application of sulphate of copper. In cases of any form of stomatitis from teething, blisters behind the ears are of great service.

The use of hard smooth substances for the purpose of pressing on the gums, has been objected to by the author, but it may safely be

left to the instinctive propensity of the child; for when the process of teething is unattended with any inflammation of the gums, the pressure produces no pain, and tends much to facilitate the absorption of the gums; but their use is obviously injurious in an inflamed state of these parts, and the child will, under such circumstances, instinctively avoid them. They can hardly be classed with amulets or charms, and placed on a level with the brains of a sucking pig, milk of a bitch, or blood of a cock's comb, which, on being applied with the fingers; it was formerly said, caused the production of teeth without difficulty. The use of these hard substances appears to have been common to all ages and among all descriptions of people; some of the aborigines of our country used smooth stones for the purpose of relieving children while teething. (See Major Long's 2d Expedition, vol. i., p. 312.)

BLOODLETTING.

Note to page 269.

A difference of opinion has prevailed among writers upon the subject of general bloodletting in infants. Sydenham, Cuming, and others have strongly advocated its use; while others, principally German and French physicians, Laennec, Henke, Vogel, etc., prefer local bleeding by cups or leeches in inflammatory diseases of young children, and Henke even limits the number of leeches to two for children under a year; others have directed six as the full number to be applied to a child that has completed a year; indeed, of late the method of depleting by leeches has become so general in treating these diseases, as almost to have taken the place of the lancet. This extensive substitution of leeches for the lancet cannot be regarded as an improvement in practice. A brief examination of the usual condition of young children may perhaps exhibit this question in its proper light.

Infants are born with the organs of digestive nutrition in a state of perfection, so far at least as the former are adapted to the food naturally provided for them. The desire for food and the act of defecation are frequent, and are evidences of the rapidity of the digestive process. This promptness of digestion is indeed necessary where there is so great a demand for materials for the growth of the body, nutrition or the process of composition being a function also performed with great activity; and if there be any period of life in which the growth of all parts predominates, it is in infancy; and it

has been remarked that the growth of an infant is greater during the third, fourth, or fifth.

The effect of this rapid assimilation is the formation of abundance of blood; vessels of the sanguineous and capillary systems abound, and blood exists in large quantities in every tissue; while the high color of the skin, and the round, plump form, prove the prevalence of fluids over the solids, and that plethora is generally the prevailing condition of infants. During this rapid increase the parenchymatous circulation is in a high state of activity; and if the formation of parts proceeds without interruption or any local stimulation, by which the quantity of blood may be increased beyond the natural requisition of the part, the healthy deposition and consequent growth continue. A slight excess of this natural action, however, produces an abnormal state, and the necessary increase of the phenomena which accompany the action of the bloodvessels, such as exaltation of sensibility, evolution of heat, &c., are the evidences that this augmented action has taken place, a condition of parts possessing the characters which distinguish inflammatory action; thus showing that the latter differs from the normal process of increase only in degree, and that there is but a step between healthy interstitial circulation attendant on the growth of a part and the diseased action of the vessels constituting inflammation.

Now since activity in the minute vessels of the growing infant is so evident, and since this activity may easily pass beyond the healthy action, upon the application of a stimulating agent, we might expect to find infants greatly liable to inflammatory or congestive diseases, and for the same reason their diseases would be more simple, more free from those complications which not unfrequently attend them in advanced life, and which on this account often require at the latter period the nicest judgment in their treatment. This liability to inflammation and congestion is fully proved by daily experience; and the freedom from complication, it is well known, exists in a remarkable degree in infants, in consequence of which bloodletting, when properly employed, is attended with less hazard than in adults, and their inflammatory diseases are much sooner relieved by early bleeding.

As infants abound in blood, and as nutrition proceeds with rapidity in their organs, any interruption to the normal action of the vessels in the formation of parts will give rise to violent congestions or inflammation, demanding an early interference for their removal. The progress of acute inflammatory diseases is often very rapid, so

rapid indeed that for the most part there is but little time left for the employment of appropriate means for their removal; sudden effusions of serum or lymph often occurring in a surprisingly short space of time after they are attacked. On this account it is that their active inflammatory affections require early and energetic attention, and it is certainly an error to suppose that general bloodletting ought not to be used for that purpose.

If the positions here taken be correct, the age of the patient, which has been advanced as an objection to the use of the remedy now under consideration, far from being a sufficient reason for abandoning it, is, on the contrary, a reason why it should be early adopted; and venesection cannot be any more "safe when the child has attained the age of one year," than before that period; the nature of the affection and the constitutional vigor of the individual must be the basis on which our judgment as to the necessity of its employment must be founded: and indeed so necessary is this operation when young children are attacked with congestion or acute inflammation in an organ essential to life, and it is to such cases we of course limit venesection, that it would be difficult to find a remedy if general bloodletting were rejected.

No better directions can be given for the employment of bloodletting than those of Celsus, eighteen hundred years since. Speaking of bloodletting, "*incisa vena*," the distinguished compiler of Roman medicine remarks: "*Interest enim, non quæ ætas sit, sed quæ vires sint.*" (Celsus, lib. ii. § x.) He then considers the nature of the disease, and if there exist a deficiency of fluids the remedy is prejudicial; if on the other hand there is a redundancy of humors, no remedy is so successful. "*Ergo, vehemens febris ubi rubet corpus, plænequæ venæ tument sanguinis detractioem requirit.*" (Loco citato.) There can be no better rule given for bloodletting, in any disease or at any age; subject always to the exceptions which may occur in individual cases, in epidemics of a peculiar character, or the condition of life of any class of people, by which a deficiency of constitutional energy may exist, bearing a resemblance to a similar condition in adults.

It has been remarked that bleeding is attended with great hazard in the state of exalted susceptibility of the nervous system of infants; and the danger of convulsions, to which they are liable, has been used as an argument for its rejection altogether; the danger has been greatly exaggerated, and it is probable, when these symptoms have occurred, that bleeding has been carried to excess, or that it was not re

quired ; but alarming prostration from loss of blood will arise from capillary bleeding as well as from that by the lancet ; indeed, the only instances in which such symptoms have occurred to the writer have been where leeches were employed ; it is exceedingly difficult to ascertain the quantity of blood lost in this manner, and a larger quantity may be taken than the case requires ; for it ought to be borne in mind that the loss of blood, like the dose of a medicine, has its limit.

The effects and risk of all measures employed in the treatment of diseases ought in every instance to be estimated by the practitioner, and where the use of the lancet is deemed necessary, the probable bad effects on the system should also be taken into account, and means used to anticipate or correct them, by proportioning the quantity to the exigency of the case, or by using appropriate measures for the relief of these symptoms when they arise. It is seldom we prescribe for any morbid affection without producing temporarily an artificial diseased action of another form, which if it be violent must of itself become of serious import ; hence the daily practice of combining in the most common prescriptions articles intended to influence, control, or perhaps in some degree to counteract the effects of a simple medicine possessing powerful properties. Ought we not, also, in the case of artificial hemorrhage, which it has been deemed necessary to induce, be ready to anticipate or remove any evil effects which may arise, instead of rejecting it because it may be followed by alarming symptoms ? Nervous symptoms, or exhaustion from loss of blood, can only arise from bloodletting being carried beyond its proper extent. The means necessary to prevent these effects are to bleed early in the disease, while the heart still possesses power to carry on the circulation with vigor, to proportion the quantity of blood drawn to the violence of the symptoms and to the age and constitution of the child, carefully watching the first evidence of its effects, when the flow of blood should be arrested ; and when these symptoms appear, or when there is reason to apprehend their occurrence, to quiet the action of the nervous system by the administration of Dover's powder or a little laudanum.

It is at the commencement of inflammatory diseases that the good effects of bloodletting are apparent, and the earlier it is performed the more decided will be the benefit ; and the relief, especially in pneumonia, is often immediate and lasting ; the practice just stated will be found a powerful adjunct to the bleeding, calming the nervous irritation, and producing a determination to the surface ; a quiet re-

pose follows, while a decided impression is made on the disease, if indeed it be not entirely removed.

Another reason has been mentioned for preferring local to general bleeding,—it is the difficulty of finding a vein in the arm; this difficulty, with a little care and practice, need not exist. If, after applying the bandage, that part of the arm where the vein lies be gently pressed and kneaded in order to empty the cellular tissue lying over it, the vessel in a little time will be brought near the integuments, and may be distinctly felt, if not seen; the practitioner will scarcely if ever be baffled if this practice be adopted. A vein on the back of the hand may often be found, if there should be any difficulty in finding one in the arm; or a vein may be found in the foot. In very young children, a leech applied to the back of the hand after bandaging the arm, will often answer perfectly well in abstracting a sufficient quantity of blood in a short time. In a case of recent occurrence, where a sudden pulmonary congestion on the third day after birth threatened the life of the infant, the writer applied a large leech to the hand with complete success; shortly after the separation of the leech the child became faint, a little breast milk was given with a spoon, it very soon revived, when the disease was entirely removed without any other means.

These remarks on general bloodletting are not intended to express an opinion counter to the use of topical bleeding, for that method is often an important addition to our resources, and sometimes indeed the only means in our power of combating inflammatory action, where venesection would be decidedly hazardous. The method recommended by the author of applying leeches to the axilla, in severe congestion of the lungs, has been used by the writer with very prompt removal of all the symptoms; it has a decided advantage over any other part, from the immediate connexion of the axillary plexus with the seat of the disease.

Since the above remarks were prepared for the printer, the writer has read with great pleasure the excellent lectures on bloodletting by Henry Clutterbuck, M. D., republished in Bell's Select Medical Library, in the No. for May, 1839. The following truly judicious observations of Dr. Clutterbuck, show the opinion of the able author on the subject of bleeding infants:

“As to age, there is hardly any that absolutely, and in all cases, precludes the use of bloodletting; for no age is exempt from the diseases and injuries which (in their very nature, it might be almost said,) call for the use of this remedy. You must not, for instance,

adopt the notion so commonly entertained, that infancy is a state of weakness that does not allow of the use of bloodletting. Strength and weakness in living beings have been looked at in too narrow a point of view, and measured chiefly by muscular power. Thus it is said that a man is strong and a child weak; and that a horse is stronger than a man, and so on; strength, however, in living beings, is to be measured by the more or less perfect performance of the different functions of life in the aggregate. In this sense strength is synonymous with perfect health. Physiologically and also medically speaking, the strength of infants not only equals, but exceeds, that of adults. Vitality is greater in early life than at later periods; all the actions of life, whether healthy or morbid, are then performed with greater energy. In infants, for example, inflammation is both more frequent and more active than in adults; and it runs its course more rapidly, through its different stages to disorganization and death. Greater promptitude and activity of treatment are therefore necessary in the application of remedies in early life, and of bloodletting among the rest, when called for by the circumstances of the case."

OCCLUSION OF THE RECTUM.

Note to page 282.

An interesting case of this malformation recently occurred to the writer.

The lady of Mr. J. P——, of this city, was delivered of a male child, on the 12th of June, 1839. He was to appearance in perfect health, and it was not until the next day that any disordered state of his system was manifested. The nurse then stated that he had passed no meconium, and appeared to be much distressed with nausea. Laxative enemata were directed to be used; a teaspoonful of castor oil had previously been given by the nurse and rejected; on making a visit in the evening of the same day, it was ascertained that great difficulty had been experienced in giving the injection. The nausea and vomiting had increased, no meconium had been voided; and on examining the abdomen it was found swelled and tense. Suspecting that there existed some obstruction in the intestinal canal, an examination was made of the condition of the rectum; the anus was found perfect, but an obliteration was discovered about three quarters of an inch from the sphincter; various-sized elastic bouges were introduced, to ascertain the existence

of a passage and to dilate it if one could be found, but not the slightest opening could be detected even with a small probe.

On ascertaining this condition of the part, the nature of the malformation was explained to the parents, and its inevitable consequence, the death of the child, announced, unless relieved by an artificial opening, which at the same time it was told them was uncertain, from the impossibility of ascertaining the extent of the obliteration. Dr. Richard K. Hoffman was requested to visit the patient; who, upon a careful examination, coincided in the opinion previously expressed, and recommended an operation, as affording the only chance of saving the child's life. Having obtained the consent of the parents, he immediately introduced a common trocar into the rectum, and passed up to the obliterated portion; this was found to be tough membrane, and some force was required to pass the instrument through. The meconium immediately flowed out on withdrawing the instrument, accompanied with a quantity of thick purulent fluid. Injections were given, and the bowels kept open by their use. He continued to have offensive discharges for a week afterwards. At the time of writing this, (July 26th,) he is perfectly well and in a thriving condition.

COLIC.

Note to page 328.

Colic is a very distressing disorder in young infants, and in some it is of daily occurrence for a long period; the contraction of their limbs and violent cries, which nothing for the time can stop, attest the severity of their sufferings. For the most part it arises from badly-digested food, where the child is artificially fed; at other times it will be produced by the quality of the milk of the mother or nurse, where she is affected with some physical derangement, or an irritable or passionate temper; when the latter is the cause, the paroxysm has not unfrequently terminated in convulsions. Although the disease is not one of danger, yet the great and frequent suffering demands the attention of the physician. It is attended in almost every instance with a great degree of flatulence, and relief is instantly experienced on the spontaneous discharge of gas from the bowels. It sometimes arises from cold, and by allowing the extremities to continue a long time wet; when this is the cause there is no flatulence, and the proximate cause appears to be an increased action of the vessels of the mucous membrane, bordering on inflammatory action.

In the treatment of this disease, attention should be paid, in the first place, to the quality and quantity of the food, and alteration should be made in the diet of the nurse, if the child be nourished exclusively by the breast. As there is often acidity attending it, an anti-acid laxative mixture will be necessary, with an antispasmodic combined. An occasional emetic, where the child is brought up with the spoon or bottle, will be required, for the removal of the undigested matter. An enema of an infusion of catnip or chamomile flowers will often afford immediate relief in a violent paroxysm of colic. In addition to these, especially where the exciting cause appears to be cold or wet, fomentations of warm water applied to the abdomen with a flannel, or frictions applied to this part with the hand, while the feet are immersed in warm water, will produce a revulsion to the surface. Suitable formulæ will be found at the end of the appendix.

FUNCTIONAL DISORDERS OF THE LIVER.

Note to page 336.

Derangements of the functions of the liver are not to be questioned, because there exists nothing uniform in its condition or in that of its secretion. For it is an acknowledged truth, that functional derangement may exist without any alteration in the appearance of the organ. Anatomical changes, for instance, in the mucous membrane of the primæ viæ, are often very various, and in some instances do not exist in intestinal fluxes. Andral observes, "the researches of modern anatomists have clearly proved that there are certain cases in which dissection cannot discover any appreciable alteration, either in color, thickness, or consistence of the intestinal parietes, or the appearance of the follicles," and "that its appearance after death does not lead to any certain knowledge of the functional derangement with which it had been affected during life." (Path. Anat.) And Mons. B. remarks that diarrhœa of infants will often rise from simple augmentation of the follicular apparatus, without inflammation or other lesion.

It is acknowledged by all who have made investigations in hepatic affections, that there is scarcely any thing of greater frequency, both in infants and adults, than to find no departure from the healthy appearance of the liver, even after the most serious affections, unquestionably connected with derangements of that organ; and, on the other hand, it is said by those who have practised in India, that pa-

tients will die suddenly from abscess of the liver without suspicion of the disease existing.

HEPATIC AFFECTIONS—BILIOUS DIARRHŒA—CHOLERA INFANTUM.

Note to pp. 331—340.

The remark of M. Broussais, "that it is necessary not to generalize too much the observations made in this country," (France,) is particularly applicable to the diseases in question. The author doubts the fact that heat irritates the liver and causes an altered state of its secretion. It is, however, not difficult to prove that caloric will often produce a great derangement of the functions of this organ, frequently ending, as is shown by dissection, in extensive disorganization. The effect of this agent was long since remarked, for Celsus observes, "*omnis calor et jecur et lienem inflammat.*" (Lib. ii. c. 1.) And, at the present time, the great prevalence of hepatic affections in tropical climates, and their almost entire absence in colder regions, are well-known truths; and scarcely a doubt can exist that it is to the influence of atmospheric heat that these diseases, so common in hot climates, are principally to be attributed. Natives of India experience to a greater or less degree the derangements of the liver, and Europeans who reside for any length of time in that country suffer, in almost every instance, from them, in some form; and all authors who have directed their attention to the subject agree in attributing them to the heat of the climate, and in considering that it is from this cause that the liver ceases to perform its functions in a normal manner. This opinion is not confined exclusively to English authors, Johnson, Moseley, Thomas, and others, who have resided in those climates; for the writer just quoted considers atmospheric heat as an efficacious agent in the morbid development of the spleen and liver, "to such a degree, that a physician who has practised in temperate climates alone, will find it difficult to believe."* Baron Larrey also noticed the prevalence of hepatitis in Egypt, and referred it to atmospheric heat. M. Villela, who resided a long time in South America, says, in a letter inserted in Broussais' *Chronic Phlegmasia*, "I venture to say that disease of the liver and spleen are as common in those countries as those of the lungs are here;" and assigns "the extreme heat and immoderate use of brandy in some and spices in others," as a cause of derangements of the liver.† Now, if there exist any analogy between the hepatic affec-

* Broussais' *Chronic Phlegmasia*, v. ii., p. 282, translated by Drs. Hays and Griffiths.

† Page 285.

tions of one climate and the pulmonary disorders of another, it appears to be illogical to refer the one class to the action of another cause, independently of climatorial influence, while for the production of the other none is found necessary; and Dr. Johnson asserts that it is well known that spices of all kinds may be devoured in vast quantities without producing any effect on the liver; but spirituous liquors, he adds, and the correctness of his remark is well known, will produce a disordered change in the functions and ultimately in the structure of that organ. Atmospheric heat, however, from the testimony of others, is of itself sufficient to produce hepatic derangements: Dr. Saunders observes that they are "the spontaneous effects of a warm climate on healthy constitutions, independently of any intemperance."* Dr. Beddoes mentions that he was informed by an officer from the place where the occurrence happened, that nearly all the men belonging to a regiment died within a short space of time of diseases of the liver, because the commanding officer would persevere in exercising them where the sun was shining.† Mr. Fitzgerald, who practised long and very extensively at Madras, and had "endless opportunities of seeing the disorder of which he speaks," mentions, in an appendix to Dr. Beddoes' essay, that it is necessary to avoid exposure to the sun, for all detachments of soldiers that were thus exposed suffered greatly from affections of the liver, and some even lost the greater portion of their men from this cause. He adds, "that the natives of India sometimes suffer in very hot seasons from acute inflammation of the liver, without the assistance of intemperance, to which they are very rarely addicted."‡ Quadrupeds, as dogs, that are not exposed to the effects of stimulating aliments or drinks, or condiments used by man, experience in India the influence of the usual morbid cause of disease, and are affected with endemic hepatitis.§ In the case of children, who are liable to hepatic affections in a heated atmosphere as well as adults, and who are not exposed to the effects of stimulating food or drinks, when they are disordered in the hepatic system in tropical climates, or in the intensely hot summers of some temperate climates, these derangements must arise from heat alone, and they necessarily experience greater disorders from this cause; for, as M. Billard justly observes, they are much more susceptible to the influ-

* Saunders on the Bile, p. 149.

† Beddoes' Hygeia, v. 2, essay 8. Bristol, 1802.

‡ Appendix to Beddoes' Hygeia.

§ Johnson on Trop. Clim.

ence of external agents than adults; and it should be noted that diarrhœal affections and hepatic disorders, which are so prevalent among children during our summer and autumn, are rarely seen at any other season, at least as epidemics. The intestines of those individuals who have died suddenly from intense heat are almost in every instance filled with bile.

It would be impossible to insert in this limited space any considerable portion of the facts which may be gathered from various sources upon this subject; enough has been said to prove that heat does affect the functions of the liver; the authors already quoted, with others, may be consulted for more extended information.*

The question here naturally arises, how does an increase of atmospheric temperature produce these effects? This is difficult to explain in a satisfactory manner. It may be, by the directly stimulating effect of heat upon the circulatory system; and the part which has a more than ordinary supply of blood, would first experience the effect of the expansion of the fluids: the liver, it must be remembered, possesses two sets of bloodvessels for nutrition and secretion, and from this circumstance would be the first to feel the effects of heat. Dr. Johnson, after long and attentive observation, refers it to a synchronous action existing between the cutaneous vessels and those of the liver, and that when the former are excited by the influence of heat, the latter also experience an increase of action; the simultaneous excitement of these parts according to this view furnishes an explanation of the manner in which atmospheric heat acts on the biliary secretion; the illustrations are striking, but too numerous for any other mention than a reference to them;† the idea, however, is not free from objection.

In support of the view of the coexistence of a simultaneous action in these remote parts, it is worthy of remark that erysipelas is often present in affections of the liver, and the species of acne in the nose and face is almost a sure indication of the congestion of the hepatic system.

All glands under a certain state of excitement secrete an increased quantity of their peculiar fluids, some indeed to a prodigious amount; and why should the liver,—a gland of the largest size, and one which from its complicated structure and double circulation must be

* Johnson on Trop. Clim. Saunders on the Liver. Cleghorn on Dis. of Minorca. Lind on Hot Clim. Meseley on Trop. Clim. Curtiss on Dis. of Ind. Chisholm on Trop. Clim. Clark on Dis. of E. and W. Indies.

† Johnson on Trop. Clim., vol. i., pp. 29—220.

liable to derangement,—be not frequently disordered in its function of secretion? We cannot hesitate in believing that it may sometimes be thus deranged; and when the organ is excited to excessive secretion, it is evident that the only means we possess of judging of the existence of this disorder, is by the presence of its secretion in the fæces, and when excessive, by its appearance on vomiting. The existence of bile in the fæces, and from which they usually receive their color, is unquestionable; for the experiments of Magendie show that, although the digestion of food was not interrupted by tying the ductus choledicus, yet the stercoraceous matter was destitute of its usual color. When therefore there is an absence or an increase of color in the fæces, it may I think be safely attributed to an absence or increase of the usual coloring matter of the stools; unless we have reason for believing that some other cause exists. It appears to be less rational to believe, in the instance related by Dr. Johnson,* of the crew of a ship sailing south, who were affected with diarrhœa, where the evacuations changed from a light color to a yellow, that it was an alteration in the color of the intestinal secretion, than, with the facts before us, of the ordinary source of colored fæces, to consider it as an excess of this coloring matter.

When an augmentation of secretion occurs, there appears generally to be an altered and often an irritating quality imparted to the secreted fluid, and inflammatory irritation uniformly occasions a vitiation of the fluid secreted. The tegumentary tissue exhibits an alteration in the fluids that are secreted from it, when in a state of inflammation, and the discharge from the inflamed part frequently produces excoriations on the healthy skin: the secretion from the nose also is, when excessive, sometimes of a highly acrid nature; I once had a lady under my care who was frequently affected with catarrh, where the discharge was of so corrosive a nature as to destroy the texture of the handkerchiefs. The alteration in the properties of mucus secreted from inflamed surfaces, is sometimes appreciable by chemical tests; that of the nose becoming alkaline, and changing vegetable blues green, while that of the intestines is acid, and the anus is often found excoriated in affections of the bowels, especially in children. It might therefore be expected, *à priori*, that so complicated a fluid as the bile would not be exempted from the general law, but that it also would occasionally undergo some change; and Andral has found that the bile, although in some instances so harmless that

* Johnson on the Liver, p. 66.

it might be "touched and tasted with safety," yet under other circumstances "it caused pustules and ulcers on the tongue and lips, and when introduced into the living body has produced more serious consequences, even death itself."* Dr. Johnson also observes that the color and taste of the bile are sometimes surprisingly altered, it being of all colors, from bottle green to jet black, and has been so acrid as to set the teeth on edge.† Dr. Rush has likewise noticed the irritating quality of the bile, in producing excoriations on the skin of those engaged in dissection. If bile can become thus irritating in quality, a diarrhœa must of necessity ensue; for in an ordinary and healthy state of this secretion, it excites a discharge of intestinal fluids, as is proved by the great dryness of the fœces where but little bile is secreted, and cases where the bile duct has been tied.

The author questions the fact of the production of a green color by a mixture of bile with acid, but experiments prove that nothing is more certain; and that this result with some kinds of acid is uniform; while it is readily admitted that there may be other causes occasionally existing, to which an altered color of the fœces may be attributed. The experiments of Tiedemann and Gmelin† show that when nitric acid is added to bile of every kind, it first becomes green, then blue and violet, and afterwards red.

Dr. Maclurg, of Virginia, some years ago made a great number of experiments on human bile: he remarks, "one of the most curious circumstances attending the mixture of the mineral acids with bile is the production of a fine green color."

In experiment No. 1, he tried the effect of sulphuric acid, which, "being poured upon some bile, produced an instantaneous coagulation of it. The coagulum, swimming in a clear liquid, was then of a pale color, as well as the liquor about it; and on shaking the vessel the coagulum disappeared, and there was formed a turbid green solution."

Muriatic and nitric acids also "produced a deep green color."

Experiments were also made with acetic and citric acids, which produced no other change than a coagulation, and a deeper yellow resembling the yolk of an egg.‡

* Andral's Pathological Anatomy, translated by Drs. Townsend and West.

† Johnson on Trop. Clim. Vol. i., p. 32.

‡ Edinburgh Med. and Surg. Journal, Oct., 1827.

§ Experiments upon the Human Bile, by James Maclurg, M. D. London, 1772. p. 11, et seq.

I have repeated these experiments on human bile with muriatic acid, which it is said by Beaumont, Lauret, and others, to be the acid found in the human stomach, with precisely the same result; a green color was produced both on inspissated and diluted bile. The experiments were repeated also with acetic acid on diluted bile, but no change was perceptible.

It may be objected to these experiments that they are not made where vitality controls the operations of the economy, and that the same results may not occur within the body; but the action of vitality, how much soever it may control, does not destroy the operations of other natural laws,—that of the rarefaction of fluids continues the same, and the chemical action of an acid on an alkali is familiar to every one. M. Billard questions the fact of the neutralizing effect of the bile; but it is certainly proved by the experiments of Dr. Prout, who placed a piece of litmus paper through the pylorus, and found the portion in the stomach become red, while that in the intestine remained unaffected.*

The existence of acid in the intestines, and the effect it has on the bile, is shown in the dissection of a child that died of cholera infantum, made by Dr. Horner,† in which disease there is often some bile secreted, although in general there is a suspension of it. "Yellow bile," he says, "was found in the jejunum, but green in the colon;" to explain which phenomenon he adds, "we know that frequently in cholera the alvine discharges are in a state of fermentation, and are sour; is this process confined to the colon? if so, the rationale is, that the bile retains its natural color in the small intestines, but becomes green in the large, from meeting there with ascendent matters, made so by fermentation."

The presence of acid in the digestive fluids is also shown by the experiment of Müller and Schwan; and that it is the muriatic acid, is proved by the suspension of the digestive process on neutralizing it, and by the restoration of this process on the addition of a proper quantity of muriatic acid.‡

From this rapid view of the subject, it appears, 1st, That the liver may be irritated by atmospheric heat; 2d, That its secretion may be augmented; 3d, That the bile may become changed in its qualities; 4th, That, when so changed, it will excite a greater flow of intestinal

* Human Physiology, by Dr. Elliotson, part i., p. 102—5th London edition.

† Horner's Patholog. Anat., p. 171.

‡ Elements of Physiology, by J. Müller, M. D., translated from the German by Wm. Bayley, M. D., London, 1838. p. 545.

secretion ; and 5th, That one of the causes of an altered color in bile is the presence of acid.

Diarrhœa with discharges, which we must still consider as proceeding from an increased action of the liver, it is well known seldom occurs during the cold seasons of the year, but is found to prevail extensively where a high atmospheric temperature exists. The discharges are abundant, and of a green or yellow color. The urine is often colored, of a deep yellow, and the eye and skin are sometimes tinged with the same hue. An acid odor is frequently perceptible in the breath of an infant affected with this disease, and the evacuations are then generally green ; and from the actions of the child, and the relief usually experienced by pressing on the abdomen, it appears to be accompanied with spasmodic pain. If these symptoms exist, there is every reason for believing that a morbid and irritating secretion is present in the bowels, which, from the views given above, will be admitted as highly probable. There can be no great hazard, as is proved by most abundant experience, in removing the acrid secretion by some mild purgative, as castor-oil. After this, there is nothing so effectual as minute doses of calomel, which, while it produces in a short time a powerful influence on the whole glandular system, thus relieving the disease by the restoration of the lost equilibrium, appears also, instead of irritating the mucous membrane of the bowels, to allay its irritability. Large purging doses, on the contrary, are actually injurious, from the stimulating effect on the mucous membrane. Whenever there is a necessity for removing the acrid contents of the bowels, nothing is better than castor-oil, with a few drops of laudanum combined. If evident acidity exist, which can often be detected by the odor from the breath or fæces, an alkaline solution may be given with advantage, and the drinks mixed with limewater ; carefully watching the effects of the latter, that the discharges may not be checked by its use, and nothing given that will arrest the discharge, unless the color become natural, when an anodyne, as Dover's powder, may be given for that purpose. Should there be much fever present, small doses of ipecacuanha, combined with the calomel, will be found useful. The existence of any inflammation in the mucous membrane may be detected by pressure with the flat of the hand ; when this is found to be the case, purgatives of all kinds must especially be avoided, and a large emollient cataplasm to the abdomen will be found necessary. Mucilages should at the same time be given, and ricewater, and milk and water, arrowroot, thin sago, and other light

farinaceous substances used for diet, according to the age of the child, throughout the disease, in all its forms.

CHOLERA INFANTUM.

The seat of this disease is evidently in the mucous membrane of the alimentary canal, as has been proved by dissection; the affection of this membrane, however, is not necessarily a primary disease, and may depend for its existence on some other organ; the consideration of the circumstances under which it occurs, and the peculiar modifications which give it its distinctive character, may enable us to obtain some knowledge of its nature. The circumstances which are necessary to the formation of cholera infantum appear clearly to be, as has been stated by Drs. Rush, Eberle, and others, high atmospheric temperature, a vitiated air, and the period of primary dentition. Neither of these causes alone, nor do any two of them, appear always sufficient for the production of this disease; for it does not occur in the pure air of the country, nor does it prevail in crowded places in cities, except in summer; nor does it affect children at any other time of life than during the process of teething; scarcely, if ever, showing itself, as Dr. Eberle observes, before the third month, nor after the second year. Should it occur, as it occasionally does, before the appearance of the first teeth, it must be regarded as an exception to the general rule; and it then arises from a cause which will be referred to after the pathology of the disease has been considered.

That the liver has an important agency in the formation of this affection, or, at least, that it is materially connected with it, is evident, from the great size and the dense and altered structure it acquires, as exhibited in cases which have been examined after death. Dr. Horner observes that the liver in cholera infantum is generally "enlarged very much, occupying two thirds of the abdominal cavity."* Dr. Dewees states that the liver, "under almost all circumstances, is greatly enlarged, so as to occupy two fifths of the cavity of the abdomen. It is merely distended or swollen by congestion, and on this account is more firm and solid than natural."† "The liver," says Dr. Eberle, "besides the engorged state of its blood-

* Horner's Patholog. Anat., loc. cit.

† A Treatise on the Physical and Medical Treatment of Children, by W. P. Dewees, M. D., p. 400.

vessels, is often greatly enlarged, particularly in cases of long continuance, and this enlargement is usually attended with a manifest firmness of its structure."* "In the abdomen, the liver has sometimes been found very large, so as to occupy two fifths of that cavity."† This condition of the liver appears also to be connected with a suspension of its secretion to a greater or less degree. The putrid and acid smell of the stools, which is a very remarkable symptom, show this; for according to the experiments of Tiedemann and Gmelin, "the bile tends to prevent the putrefaction of the food during its passage through the intestines, because when prevented from flowing into them, their contents appear further advanced in decay than in a healthy state."‡ It is also evident from the fact that no disappearance of the symptoms occurs until the liver has fully resumed its functions. Dr. Eberle says, "so long as the liver remains inactive, and the alvine discharges free from bile, the disease may be regarded as still possessing all its violent and dangerous tendency, whatever abatement may occur in the severity of the vomiting and purging."§

Finding this state of the liver existing in cholera infantum, and knowing that atmospheric heat develops an irritated condition of this organ, and also that this is one of the essential causes of the disease in question, it might very naturally be supposed that the liver had some agency in its production through the medium of the portal circulation. Again, the disease does not appear except in a vitiated air. Malaria of marshes will cause affections of the liver, and "gall sickness" is a popular name for diseases arising from an over-excited state of this organ, accompanied with an increased secretion of bile in malarious situations; these diseases are not confined to the human race, for hogs killed in the neighborhood of marshes where intermittents prevail, have enlarged livers.¶ Cleghorn and Sir J. Pringle have observed that marsh miasmata in warm climates produce their principal effects on the liver, and that hepatic disorders prevail more along the borders of the great rivers, where an insalubrity of atmosphere exists. What good reason is there for believing that malaria of cities may not, when united to another cause, produce a similar

* A Treatise on the Diseases and Physical Education of Children, by John Eberle, M. D., p. 286.

† Remarks on Cholera Infantum, by James Jackson, M. D. N. E. Jour. of Med. and Surg., v. i., p. 24.

‡ Edin. Med. and Surg. Journal, 1827.

§ Eberle, p. 285.

¶ Inaugural Dissert., by E. G. Ludlow, N. Y., 1823, p. 32.

effect on the same gland? For the effect of malaria is doubtless produced through the agency of that part of the system which is more immediately connected with the air, i. e., the lungs; and its action probably arises either from some deficiency of oxygen in the respired air, or from some paralyzing influence it possesses. The experiments of Tiedemann and Gmelin, who have investigated with great ability every thing relating to the liver and its functions, will throw some light on the action of malaria on the liver, if the opinions they entertain, in regarding this organ as performing a function supplementary to that of the lungs, be taken into consideration. That it performs some other part besides the secretion of a small quantity of bile when compared with the size of the gland whence it issues, is a supposition far from being unreasonable; and that its office may be that of an assistant to the lungs is not improbable, as will appear from the following facts.

These experimenters have remarked that the size of the liver is not proportionate to the quantity of food taken, but is inversely proportionate to the size of the lungs; and in warm-blooded animals that have large lungs and live always in air, the liver compared with the body is proportionally less than in those that live partly in water. They have also shown, by many examples, that the quantity of venous blood sent through the liver increases as the pulmonary system is less perfect. It is larger in reptiles, fishes, and moluscous animals. It is also proportionally larger in the human foetus; and its activity has also been ascertained in hybernating animals during the suspension of respiration, when bile is constantly secreted.*

From the fact also of the existence of a large portion of carbon in the resin of bile, it would seem that the blood in secreting this fluid parts with some of its carbon, and if so, the liver certainly performs a function, in a degree at least analogous to that of the pulmonary system.

We might therefore expect to find an increased action in the liver whenever there is a change in the quality of the atmosphere by which its usual active properties are impaired.

There then appears to be two causes producing inordinate hepatic action, and a distension of the organ is very likely to ensue; for when there is a large quantity of blood circulating in it, from its loose structure it is readily distended, as is the case in the foetus; and indeed it more often enlarges than inflames. Whenever also a gland

* Edinburgh Med. and Surg. Journal, loc. cit.

is excessively irritated, a suspension of its secretion often ensues, as is daily seen in bronchial and other inflammations; and the suspension of the biliary secretion occurs to a greater or less degree in cholera infantum. From these causes a congestion of the liver takes place, which, obstructing the free passage of blood, the vena porta thus becomes filled, and the parts whence it receives its blood are consequently congested. These parts are nearly all the abdominal viscera, and the blood, as is well known, instead of being conveyed directly to the heart, is collected into one trunk and carried through the liver, dividing as it passes into numerous branches, which are again collected into another trunk passing into the ascending cava.

This congestion, however, is not sufficient of itself to form the disease in question, and there must be some reason for its appearance only in the mucous follicles, as is shown by the dissections of Dr. Horner to be the seat of this affection,*—some circumstance must arise to fix it in this part. The following appears to be the explanation: From numerous dissections, M. Billard has demonstrated that at the time of dentition there is a general development of all parts immediately connected with digestion, and that the follicular apparatus of the stomach and intestines is in a state of excitement, and undergoes a remarkable change simultaneously with the eruption of the first teeth, secreting an abundance of mucus, either to assist in the assimilation of the new kind of food which the infant will soon require, or to protect the mucous membrane of the intestines from the irritation to which it will thereby become exposed.†

From the remarkable fact, therefore, of the occurrence of the disease at the time of teething, when the muciparous follicles are in a state of exalted functional excitability—from the enlarged condition of the liver in almost every instance—it is evident that cholera infantum is a disease seated in the mucous follicles of the intestines; and that hepatic congestion is necessarily connected with it; the disease of the follicles being a secondary affection, caused by the congested state of the liver, by which a free passage of blood is prevented; the portal vein is thus crowded, and the return of blood from the extreme branches arrested. The natural development and excessive action of these follicles at the time of dentition, place them in a condition to take on a deranged action upon the occurrence of any cause which would produce congestion in them; it is on this account that the disease is fixed in this apparatus alone, while other

* Horner's Pathol. Anat., loc. cit.

† p. 386.

parts of the viscera also returning blood through the liver, not being so predisposed, are exempted from the effects of congestion.

In addition to these characteristic symptoms, there exists also in most cases a very remarkable heat about the head, throughout the whole of the disease; this may be explained to arise from the great tendency under any existing disease, at this period of life, to cerebral irritation, from the quantity of blood circulating in that organ during its development, which M. Billard observes is not completed until the end of a year. Teething, to which cerebral affections are often assigned, is probably but an occasional source of additional irritation.

The treatment should be mainly directed to the relief of the glandular congestion on which the disease depends; for if once a free secretion of bile is obtained, the disease may almost be considered as overcome: "the sooner the liver can be brought to resume its secretory action, the greater in general will be the probable ultimate success in our attempts to subdue the disease."*

In the forming and early stages of the disease the most obvious remedy is the abstraction of blood from the right hypochondrium by means of leeches; in conjunction with this remedy minute doses of calomel, as recommended by Dr. Dewees, are the best means of fulfilling the indication. Judging from experience, the use of calomel is the most efficacious method of combating the disease; far from increasing the irritation of the mucous membrane, in these small doses, calomel appears to allay it, and a quiet repose often follows. To this is sometimes added small doses of ipecacuanha, from its usefulness in creating a diaphoretic action; but the great tendency to vomiting often forbids its use. When the latter symptom exists to any great degree, a large stimulating cataplasm of camphor ought to be applied over the stomach, or frictions of tincture of capsicum and camphor with a flannel may be used. Blisters have also been found very beneficial by some practitioners to allay the excessive morbid action of the stomach and bowels. Toast water and an infusion of roasted Indian corn, taken cold and in small quantities, will be found useful in allaying this irritability. Dr. Dewees recommends injections of salt and water for the same purpose; a revulsive effect is produced by their use, and to the irritation they occasion in the lower intestines is their benefit to be attributed; they are the more useful when, as is sometimes the case, but little affection of these intestines exists. When the irritability of the

* Eberle loc. cit.

stomach is connected with acidity, which may generally be detected by the odor of the matters vomited, a few grains of prepared chalk may be combined with the calomel; other alkaline remedies, and the effervescent mixture, will be found useful for the same purpose. The warm bath is a most efficacious adjunct to the usual remedies in this disease.

There are often present some symptoms of inflammatory action, known by a tenderness of the abdomen; and when there exists great heat about the head, local bloodletting, by means of leeches, is indicated, and should not be omitted.

From the irritation which teething often creates, it is a useful and indeed a necessary operation to divide the gums freely to the socket; no harm can ever result from this practice; on the contrary, when the gums are swollen, and to appearance painful, great benefit is derived from the operation.

Dr. Mann speaks very favorably of the use of acetate of lead in this disease;* it is evident, however, that so powerful an astringent cannot be safely used until the disease has passed through its first stages, and has assumed something of the character of chronic diarrhœa; and in the diarrhœa attendant on excessive action of the muciparous follicles, without inflammation,† astringents are clearly indicated. It is in this stage of the disease that infusions of nutgalls, columbo, logwood, pomegranate bark, recommended by practical writers, are found useful; and it is in this stage also that spirits of turpentine has been found beneficial, in doses of from five to twenty drops, three or four times a day.‡ Dr. Eberle and Dr. Condie recommend its use earlier in the disease, "to check the disordered action of the stomach." With the recorded experience of these gentlemen it may safely be regarded as a remedy for the disease under consideration.

Great benefit is derived from the use of mild astringents and tonics during convalescence; the diarrhœa being then but a simple and almost a natural increased action of the muciparous follicles, from the change in the system at this period of life. The instinctive desire for exciting food is very remarkable during convalescence, and infants are often seen greedily sucking a piece of salted pork or fish: the gratification of this instinct, Dr. Rush observes, may be allowed, and often with obvious relief to all the symptoms; and Dr. Hosack recommends the juice of shellfish during convalescence.§

* Vide New York Med. Repos., vol. ii., p. 309.

‡ Dewees, loc. cit.

† Vide p. 366.

§ Hosack's Essays.

This eager desire for stimulating food affords a striking illustration of the nature of the disease here taken, and of the inordinate and diseased development of the parts that are at this time of life undergoing a change for the reception of a new kind of food. The occasional production of the disease also by the premature use of solid and stimulating food, thus exciting into inordinate action the parts which have been pointed out as concerned in digestion, again illustrates its pathology.

The strictures of the author on the non-success of American practice and prophylactic treatment in cholera infantum, are not more just than similar strictures would be if applied to any other disease that baffles the skill of all physicians; such, for instance, as phthisis, in all countries,—spasmodic cholera, in India, America, or France.

In many diseases, there may be, and often is, a limited view of their nature, when studied only as they are manifested in one organ, without considering the connexion it may have with others, and in some cases even the absolute dependance of one organ on others for the continuance of its healthy functions. To the disease we have just been considering this remark applies with more than ordinary force; and the extended view of it, and the consequent treatment adopted in this country, is the result of a vast accumulation of experience, obtained where the prevalence of the disease is coextensive with the boundaries of the land, and where its appearance is annually anticipated with the same certainty as that of the season which gives it existence. Those who have recorded this experience are men who have distinguished themselves in the fields of science, and who are unsurpassed in sagacity, and in the attainment of the object of all intellectual culture when applied to medical science,—a solid philosophical judgment. It would be impossible, as it would indeed be unnecessary, to attempt to exhibit at length the professional character of some of our distinguished countrymen; but a reference to our numerous medical treatises may with confidence be made, in proof of the industry, erudition, and genius displayed in the cultivation of the science of medical philosophy.

SUSPENSION AND RETENTION OF URINE.

Note to page 351.

When it is ascertained that there is a suspension of the urinary secretion, and that the bladder is empty, we ought to avail ourselves of those means which will excite the secretory function of the kidneys. A small quantity of infusion of parsley root, with a few drops

of Spts. Nit. D. will almost always succeed in effecting this object, particularly if assisted with the warm bath and enemata.

Retention of urine immediately after birth not unfrequently arises from mucus, which may be removed with a small probe. Fomentations with hops, or flannel dipped in warm water, and applied to the pubic region, or frictions with camphorated oil, will often relieve it, when arising from spasm of the neck of the bladder. If, however, these measures should not speedily relieve the retention, no time should be lost in vain attempts to relieve this dangerous affection by a reliance on these applications, but a small-sized flexible catheter ought to be carefully passed into the bladder, as the only efficient means in our power of procuring an evacuation of urine.

It is of great importance to ascertain the existence of this disease, for doubtless, as Dr. Dewees correctly remarks, some infants have perished from this affection without its having been suspected. No reliance, therefore, should be placed on the representation of nurses, that the urine is regularly discharged; but, when there is reason to suspect the disease, the physician ought carefully to examine the abdomen and pubic region for the symptoms which indicate a retention of urine.

CROUP.

Note to page 388.

Having for a number of years been in the habit of treating this disease with uniform success, according to the views and principles taught by the late Dr. David Hosack, when professor of the theory and practice of physic in the College of Physicians and Surgeons of the University of the State of New York, the translator, by permission, avails himself of the opportunity afforded by the publication of the lectures of Dr. Hosack, (Philadelphia, 1838,) to copy a portion of his lecture on the treatment of croup:

“Writers upon this subject differ as widely as they do about the nature or character of the disease; but none, in my opinion, appear to have sufficiently discriminated between the different stages in which the remedies they severally recommend ought to be employed; even Dr. Cheyne’s late valuable work, and which contains the best pathology of this disease, is in some degree defective in this respect. I have been led at the bedside to distinguish *three* distinct stages of croup: the first may be denominated the forming stage of the disease; in this the affection is local; the irritation has not

yet extended to the whole system ; the child even sits laughing and playing upon the lap of its mother, manifesting a very unusual but morbid degree of exhilaration ; its skin is cool and moist, its pulse not perceptibly accelerated ; but its hoarse, hollow sounding, and frequently-returning cough, its wheezing inspiration, its restlessness, and especially its cries after a fit of coughing, all denote, to the physician and parent acquainted with the disease, the consequences that will soon ensue, if active means be not employed to prevent the second, or febrile stage.

“In this stage the whole system partakes of the irritation ; the pulse is frequent, the skin hot and dry, the respiration hurried, the tongue covered with the usual white fur indicative of inflammation, the lips and cheeks remarkably florid, the cough frequent, but attended with a more acute sound than that of the first stage ; every inspiration, too, is attended with more uniform wheezing than that which appears in the first, when occasionally an interval occurs, in which the child breathes as if in health. But in this second stage no such interval is perceived ; the trachea, bronchiæ, and lungs become so surcharged by the circulating fluids, that the child has not even a momentary relief from its oppression ; and in a short time, if left to itself, especially if the patient be plethoric, the countenance exhibits a purple, livid color, not unlike that of apoplexy, and is even attended with a degree of stupor, or propensity to sleep. This loaded state of the lungs, and interruption to the free return of blood from the head, I have frequently witnessed in this stage of croup : if the patient be now neglected, or the evacuations be sparing and insufficient, an effusion from the exhalent vessels opening into the windpipe, bronchiæ, and surface of the lungs, inevitably takes place. In the two former, the effused matter assumes a membranous appearance, probably owing to the forcible passing and repassing of the air through the preternaturally constricted tubes ; but in the lungs themselves, it appears in the form of a viscid fluid, partly resembling both phlegm and pus. When this effusion has actually taken place, the febrile symptoms sensibly abate, and sometimes disappear altogether ; the child is also apparently free from pain, but it suffers violent paroxysms of cough and difficult breathing, attended with an irregular and spasmodic respiration, as in asthma or dropsy of the chest, and with similar intervals of ease. These paroxysms, in young children, continue but a few hours before dissolution. But in children arrived at eight or ten years of age, they frequently continue several days.” “This stage, in which the membranous effu-

sion takes place, I denominate the membranous, or purulent stage; from this advanced state of the disease recovery is so rare, that it is not to be expected; it might almost be denominated the fatal stage of croup. These distinctions it is, in my opinion, important for the practitioner to keep in view, as they lead to important conclusions in practice. They teach us, during the first or forming stage of this disease, to adopt the most active means of restoring the suppressed secretions of the trachea and surface of the lungs, and by open bowels and perspiration to guard against the general excitement of the system. For this purpose, when called to a patient laboring under the first symptoms, in which the disease appears to be confined to parts primarily affected, it is my practice to administer an emetic composed of tartarized antimony and ipecacuanha; to a child under two years of age, I direct from one to two grains of emetic tartar, with from five to ten grains of ipecacuanha, every fifteen minutes, until it operates to such a degree as to induce a plentiful secretion from the trachea and lungs. It is surprising, in some instances in this disease, to see the immense quantity of viscid, ropy phlegm discharged by the operation of an active emetic at this period of the complaint; but when this discharge has been accomplished, and the cough become loose, which is an evidence of the natural secretion being restored upon the surface of the parts affected, we may, in most cases, consider the patient secure from danger." "In this second stage of croup, such is the determination of the circulating fluids to the part affected, and such the general febrile excitement of the system, that the most efficient means of diminishing the plethora of the bloodvessels, and of diverting the irritation from the part affected, become necessary. With this view, the patient should be bled freely, in proportion to its age and powers of constitution; say, for a child under two years of age, from two to four ounces; from two to six years, from four to six or eight ounces, and to be repeated as the urgency of the symptoms may require." "Although I am not an advocate for small bleedings in croup, let me here take occasion to express my disapprobation of the practice of some physicians, especially that recommended by the late Dr. Bayley, of this city, Dr. Ferriar, of Manchester, and Dr. Dick, of Alexandria, (see third Supplement to Dr. Barton's Med. and Physical Journal, for May, 1809, p. 242,) I mean that of bleeding the patient until fainting be produced. The relaxing effects of bloodletting upon the system are no doubt desirable in this complaint, and were probably the objects which the advocates of this mode of treatment had in

view; but having observed, in some instances, very serious and permanent evils to the constitution, occasioned by the debility which this profuse evacuation had produced, and knowing that even the most violent attacks of croup will yield to a less excessive evacuation by the lancet when conjoined with other remedies, I have hitherto objected to this practice in the extent it has been recommended. After bloodletting generally some partial relief is immediately obtained; respiration is less frequent; the peculiar noise of inspiration is also diminished; the cough becomes more loose and yielding; the skin is rendered moist, and the pulse less tense and frequent.

“But these favorable symptoms are oftentimes deceptive, and of short duration: the cough, labored respiration, and heat of skin, are perhaps all renewed in the course of an hour. In that case, the antimonial emetic must be immediately employed. Although the force of the disease may have been greatly subdued by bloodletting, the alarming symptoms so frequently return, that I am now in the constant practice of prescribing the emetic immediately after bloodletting has been performed, without waiting to ascertain the effects which the bleeding alone might produce; if, however, after the operation of the emetic, the symptoms still continue violent, I usually repeat the bleeding, immerse the patient in a warm bath, apply a large blister to the throat, covering the larynx and trachea, and administer a cathartic of calomel, from five to ten grains, repeating this medicine every two hours, until it produces some sensible effect in this respect, at the same time soliciting its operation upon the bowels by injections occasionally administered.

“These several remedies have been employed, and having failed completely to subdue the febrile symptoms, and to divert the irritation from the trachea and lungs, I next direct small doses of calomel and James’s powder, from two to five grains of each, to be given every two hours, to a child under four years of age; but when sufficient evacuation from the bowels may have been procured, I frequently prescribe the antimonial wine, or a solution of tartar emetic, in such doses as to excite a considerable degree of nausea and relaxation; with these I occasionally blend a small portion of laudanum, where it may be indicated either in consequence of the profuse evacuation by the bowels, or when the cough may be very harassing to the patient, which is sometimes the case when the febrile symptoms are greatly moderated; in other respects laudanum should be administered with great caution in this disease.

“The physician is sometimes called upon at a late period of the

disease, where the means which have been described have not been employed; or if they have been, may not have succeeded, and in which the third stage of the disease has become apparent. Respiration, as in the two preceding stages, is still laborious, accompanied with the same wheezing noise upon every inspiration; the cough also continues violent, without the least expectoration, and returns in paroxysms, in which the patient is threatened with immediate suffocation; the countenance exhibits a blueish livid appearance, at the same time that the patient manifests the greatest anxiety and distress; occasionally, however, it has intervals of ease, in which its sufferings are apparently inconsiderable; but these intervals are of short duration, and afford no prospect of relief, for the effusion mentioned, and the consequent formation of a membranous matter lining the trachea and bronchia, has already taken place. In this stage of the disease, it has occasionally happened that portions of the membrane have been thrown off by coughing, by which the patient has happily been preserved." "Calomel, in small but repeated doses, squills, the syrup of onions, the seneka snakeroot, ammoniæ, and asafœtida, and the vapor of vinegar and water, are the medicines in which I am inclined to place most reliance at this advanced period of croup. As they are a class of remedies calculated to excite the secretions from the lungs, without impairing the general powers of the system, they afford, if steadily persisted in, the means of loosening and of ejecting the membranous matter, as well as the fluid materials effused over the surface of the lungs." "Dr. Archer, of Maryland, has rendered an important service to medicine by reviving, not introducing, (see Woodville Drinker's remedy,) into general use the polygala senega, as a remedy in croup.

"Hitherto, however, it has certainly disappointed the expectations of most practitioners, because it has been prescribed indiscriminately in every stage of the disease; whereas, for the very reason that it is so useful in exciting the vessels of the trachea and lungs to a powerful excretion of the materials oppressing them in the last stage of croup, it is certainly a hazardous prescription when those organs are preternaturally excited, as they are both in the forming and febrile stages of this disease."

Vitriolic emetics have of late years been much used in the membranous stage of croup. Three cases under the most unpromising circumstances, successfully treated by sulphate of zinc, are recorded in the 3rd volume of the New York Medical and Physical Journal.

HOOPINGCOUGH.

When there are present any symptoms of inflammatory action, it is obvious that the proper remedy is the abstraction of blood by the lancet or by leeches; and in case of plethora with threatened congestion of the brain, bleeding is an important and even a necessary remedy. When the inflammatory irritation is in some measure subdued, a sedative mixture will be found of great efficacy in allaying the distressing fits of coughing.

As the child is constantly annoyed with a quantity of viscid mucus, emetics will be found useful, and will almost always shorten the paroxysm of coughing; small doses of ipecacuanha or tartar emetic given during the interval for the purpose of allaying the febrile action, will on the accession of a cough often act as an emetic. Tartar emetic combined with testaceous powder is an old and favorite prescription. There is evidently a disordered condition of the stomach and bowels, generally accompanied with acidity, as the altered state of the secretions show. It will therefore be necessary to attend to the *primæ viæ*, and administer laxatives throughout the disease: soda, rhubarb, and ipecacuanha will be found a good combination for this purpose.

Narcotics have been found highly necessary in the spasmodic or chronic stage of the disease; and opium, conium, hysoscyamus, lactuca, belladonna, &c., have all been used with various success. Belladonna has within a few years been highly successful, in the hands of Bonda, Hufeland, and Alibert, and more recently by Dr. Weldeck, of Berlin. Dr. Eberle speaks with great confidence as to the value of this remedy from the experience of a number of years; limiting its use to those cases in which there is absence of fever and bronchial inflammation, and where the disease is purely of a spasmodic form.

Hydro-cyanic acid has of late been much used in the treatment of hoopingcough, with great success in a number of cases; but, like every other remedy in this disease, it has sometimes failed in giving relief. Dr. Hamilton Roe, however, observes, "that the cases are so very numerous in which this medicine succeeds,—especially if it be given at the commencement of the disease,—and so very few in which it fails of speedily producing a beneficial effect upon the cough, that my first impression on hearing that a child who has been using it is no better is, that the acid cannot have been good."

(Treat. on the Nat. and Treat. of Hoopingcough, &c., London, 1838.)

A mixture of belladonna, ipecacuanha, and sulphur, used alternately with hydro-cyanic acid, has been employed by Dr. Kahleiss, (*Hufeland's Journal*, 1829, copied in the *Amer. Jour. Med. Science*, May, 1830,) with great advantage in one hundred cases of pertussis, when unattended with pulmonary congestion. The prescriptions will be found among the formulæ at the end of the appendix. The proportion of the articles ought to be increased or diminished according to the age of the child. Sometimes these remedies do not show their effects in four or five days. When a dilatation of the pupils arises, and an efflorescence appears on the skin, the treatment must be suspended for twenty-four or thirty-six hours, and the proportion of belladonnæ diminished.

The use of antispasmodics combined with expectorants is a good course of treatment to adopt when there remains much evidence of bronchial inflammation, and asafætida is one of the best that can be used.

In protracted cases, attended with debility, tonics have sometimes succeeded; and Peruvian bark has been used for a long time. Sulphate of quinine has been found peculiarly serviceable by Dr. Dewees; and arsenic was employed by Dr. Ferriar as a tonic, in some cases of obstinate hoopingcough, with advantage.

Where there is but little bronchial inflammation, a change of air is a most powerful remedy, and in protracted cases is often the only one which will arrest the disease.

MENINGITIS—HYDROCEPHALUS.

Note to page 484.

The most important remedy in this disease is early bloodletting. It is a disease of so dangerous a character that it is of the highest importance that it should receive prompt attention as soon as its nature is perceived. A purgative of calomel ought to follow the bleeding, both for the purpose of removing any irritating matters, as well as by its influence on the liver and entire secretory surface of the intestines to effect a powerful revulsion from the head. Free leeching from behind the ears ought not to be omitted. The state of the gums must also be examined, and cut if necessary.

The use of mercury in this affection, both externally and internally administered, has received the sanction of all practical writers.

Dr. Mills, in a paper published in the Transactions of the King's College of Physicians in Ireland, recommends its use in combination with the watery extract of opium. He remarks, "the good effects of a combination of these remedies seem to depend on their power of equalizing the circulation, increasing the secretions, and exciting the action of the cutaneous vessels, in consequence of which the congestion of the blood in the brain or in any other part is removed." Occasional revulsive baths to the lower extremities, while cold is applied to the head by means of a bladder partially filled with iced water, should be used while the head continues hot. A blister is often serviceable on the neck or between the shoulders, after the first violent symptoms are subdued.

When effusion has occurred, little or no benefit can arise from a perseverance in the active antiphlogistic course. Hydrogogue cathartics have been sometimes successful under the most unpromising circumstances in children advanced beyond the period of infancy, and diuretics might be advantageously employed after effusion has occurred. A case came to the writer's knowledge where an infant of six months old, after having every symptom of effusion, and the disease, to appearance, fast approaching to a fatal termination, recovered after a spontaneous discharge of a large quantity of urine.

VIABILITY.

Note to page 543.

I shall conclude these notes with a communication which I received from Professor JOHN W. FRANCIS. It embraces topics having a close relation to the facts and doctrines advanced in the last section of Mons. Billard's treatise.

NEW YORK, July 1st, 1839.

DEAR SIR,

Agreeably to your request, I have hastily put together some remarks on that section of Mons. Billard's work which relates to the *viability of new-born infants*. It were superfluous to offer any detailed observations on a production so eminently characterized by close investigation and reflections as the entire performance of M. Billard; and, from the nature of your investigations, I feel justified in restricting the present note to this last portion of his treatise, which more especially involves disquisitions on juridical medicine,

In the elaborate section of Mons. B. on the viability of new-born infants, may be found an interesting and valuable association of facts of great practical importance, and which recommend themselves to our notice, no less by their novelty than by their pathological relations. Many of the circumstances noticed by the author, while they are intimately interwoven with the science of forensic medicine, must be familiar to all who have observed in the school of clinical experience; but never, until now, has so large a group of hitherto isolated facts been brought to bear on this subject, of so much interest in juridico-medical investigation. All that I feel authorized to add to this section are a few incidental remarks, having a tendency in some respects to corroborate occasional opinions given by Mons. B., and thus augment the data on which future principles on some controverted points may be the better recognised.

In two distinct portions of this elaborate dissertation, the author has enlarged, with philosophical acumen, on the alterations of color of the skin: in the subsequent part he has dwelt with advantage on the most striking causes of *cyanosis*.

We must ever bear in mind the clinical observation of Corvisart, that cyanosis, though often found associated with an open state of the foramen ovale, may yet exist without this imperfection: the blue color has been often manifested in early life, while no communication has been traced between the opposite sides of the heart. This patulous condition of the foramen ovale, though actually existing, is sometimes brought to evidence itself only when obstruction of the circulation through the lungs occurs by pulmonic congestion or disease. Crampton tells us that he has seen several cases where there was a free opening between both auricles and ventricles, which must have subsisted for years, and yet in which there was no cyanosis. That the open state of the foramen ovale is not necessarily a cause of cyanosis, we have the authority of M. Ribes, in the case of a man of sixty years, in which the auricles communicated without there being any change in the color of the skin. In a recent fatal case of the puer cœruleus, occurring in a subject which survived but about thirteen days, and where the blue color was periodically intense, the intermission between each pulsation was very repeatedly seven minutes and a half, and on some occasions eleven or twelve minutes. The double relationship between the state of the lungs and that of the brain, deserves to be as closely scrutinized as the condition of the heart in cyanosis. We have all recently witnessed, by dissection, during the prevalence of the Asiatic cholera in New York, the

influence on the vascular system induced by obstructed circulation in the lungs and through the heart. A like remark may be made concerning the disordered phenomena made so conspicuous by autopsic examinations of bodies dead by the drinking of cold water during the extreme heats of our summer. In many of the cases which I have investigated, the lungs, and their proximate organ, the heart, have betrayed the pathognomonic signs of inordinate thoracic fulness, and a passive dilatation of the right ventricle. In deaths by lightning, I have sometimes traced, by dissection, appearances of a similar nature, with cerebral fulness, and doubtless accompanied with exhaustion of all nervous energy. So, too, by the dissection of the dead body of the gross inebriate, these local discharges may occasionally have been seen, while upon inquiry it is readily ascertained that cyanosis has often characterized the external surface of the unfortunate victim previous to death. All these examples may be cited, to demonstrate a cyanose state influencing a stagnation in the capillary system. In short, in the advanced stage of various affections, accompanied with a disordered circulation, we may often become the observers of this cærulean discoloration.

It is essential, in noticing cases of preternatural or abnormal growth of the tongue, to discriminate between congenital enlargements of that organ and glossitis, embracing the numerous causes which induce that condition, which in reality ought to be considered as the results of inflammatory action. Instances of this character have been encountered by many who have remarked the deplorable effects of mercury on some individuals. Dr. Good's *Study of Medicine* contains some valuable records of cases illustrative of the remarks of our author. (See edition edited by Dr. Doane.)

The observations of Mons. B. concerning congenital malformations of the intestinal canal, are in conformity with the experience of all conversant with autopsic examinations. An instance came within my own inspection several years ago, of the smaller intestines, so called, being in reality the larger, while nearly the whole tract of colon and rectum was so diminished in its caliber as scarcely to admit the passage of a crow's quill. The child lived until the fourth day after its birth, and no suspicion was entertained of any abnormal state until some forty hours of its life had passed, and the derangement of its excretory functions led to a closer scrutiny of its physical condition. Dissection made palpable the fatal peculiarity of structure. A very striking variety of intestinal structure is re-

corded in the American Medical and Philosophical Register of New York, which deserves to be adverted to in these addenda, not only on account of its extreme rarity, but because of its signal influence as an efficient agent in determining the fatality of various affections of the bowels. This case of peculiarity of formation is denominated a *diverticulum from the ileum attached to the umbilicus*. The patient died from obstruction and enteric inflammation. The preternatural formation was about three inches in length, and so firmly attached to the umbilicus as to leave no doubt of its having been a congenital product; and yet this patient had arrived at the age of thirty-five years. The details of this instructive example of intestinal malformation I have published at length in the work just referred to; volume 1st, 1810.

The remarks of Mons. B. on the disorganization of the muciparous follicles of the intestines, are of unquestionable importance in a practical and in a medico-juridical point of view. The cause which he seems to have assigned as the origin of the cholera infantum in America is too restricted; though there is a sound and important inference to be drawn from his reflections on the nature and character of the different species of alvine discharges depending on the diseased condition of the internal lining of the intestinal tube. The white or pultaceous softening of the mucous membrane of the intestine is undoubtedly conspicuous among the causes of this affection: and as it is a disorder often occurring among the inhabitants of warm climates, we may be led to infer that disorganization in the functions of the liver is at times to be enumerated among the sources in its production. Dr. Baillie, in the Medical Transactions of the College of Physicians of London, vol. 5, has a paper on a kindred affection, which he has termed a *peculiar species of purging*, and which he says is hardly ever radically removed. Persons who have resided for a considerable time in a warm climate, he observes, and those who have suffered from affections of the liver, are more liable to it: but it occasionally takes place in those who have never been out of Great Britain, and who have never suffered from any disease of the liver. It occurs more frequently in men than in women; but this he thinks most probably depends in a great measure upon a larger proportion of men going to warm climates than of women.

This affection is sometimes found to afflict individuals who arrive in New York from our Southern states. In all the cases which I have seen they were male subjects; and of eight instances of the complaint, two were evidently blended with hepatic disturbance.

It occasions within a short period extreme emaciation, and a state of the surface not unlike that induced by diabetes. The mercurial treatment is unavailable. Strychnine I have thought in some instances a valuable adjuvant to the most appropriate means of relief pointed out; but for the most part this chronic disorganization of the viscera is found to baffle the soundest principles of the curative art.

The facts of the early hepatization of the lungs, remarked by our author, have occasionally been observed by American pathologists. We may also add that the phenomena of partial respiration, as recorded by Mons. B., by which the infant may seem to be endued with life and yet shortly expire from the want of a free and permeable respiration, have been witnessed by every physician extensively engaged in obstetrical practice. That instances of asphyxia in newborn infants are sometimes the result of the action of ergot or spurred rye, administered during labor, cannot admit of doubt. Several of my medical friends have observed cases of asphyxia arising from this origin; and I feel persuaded that the annual list of stillborn infants, published by our constituted authorities in the bills of mortality, is greatly increased in numbers by the use of this potent agent. Indeed, I deem it expedient that in all cases of stillborn children, inquiry should be made whether ergot had been administered during the parturition.

There is much observation and close reflection in the second part of our author's paper, and his medico-legal inductions are to be ranked among the best grounded in the science of physiology and pathology. The many volumes which have been written on the *docimasia pulmonum* since the celebrated essay by Dr. William Hunter, render it unnecessary to enlarge at an extent on this perplexing subject. The test of Dr. Hunter concerning the floating of the lungs of the child who has respired, and the vast inferences which have hence been deduced from these circumstances, are not at the present day considered so conclusive as they were estimated at an earlier period in medico-legal studies. Though Swammerdam and Haller, as well as Hunter and other high authorities, affirmed that a single respiration would cause the lungs to float, yet the obstetrical practitioner is aware that children occasionally do not breathe until they are born for some time; that respiration itself does not uniformly dilate the lungs, and that they are in some instances so feebly or partially dilated by imperfect breathing, as nevertheless to sink in water. Nor need we marvel at these phenomena, the fact being

well recognised, that an ordinary inspiration dilates, but in part, the entire pulmonary lobules, even in the normal condition of the organs. These, and many other facts of an indubitable nature, have rendered the hydrostatic test upon which so much reliance was once placed inconclusive. I lately witnessed a case of premature delivery, at the period of seven months gestation, in which the child manifested feeble respiration somewhat over two hours, when life no longer being apparent, the lungs were subjected to the hydrostatic test of Hunter; and, though the lungs were minutely divided into small portions, yet each portion sank in pure water: this instance, indeed, occurred to the lungs of a seventh month child, but I might here record the particulars of several examples occurring with the lungs of children born at the full time, and with a like result. Schenkius, and also Bernt and others, have observed the same result of the inability of the lungs to float, though cut into pieces, even when taken from the infant born at the mature period, and who had lived one, or even two days.

I purposely avoid detailing the several states of diseased or congested lungs in infants, which might entirely defeat the validity of the test of Hunter; nor need I dwell upon the practical inference which may be deduced from the occurrence that the child will occasionally enjoy a fair respiration upon the protrusion of the head, while the shoulders are locked in; and in such case be wedged beyond the possibility of the natural efforts effecting its complete birth. Moreover, Professor Osiander, on the respiration of the fœtus, has given us important facts touching the vagitus, respiration, and vitality of the human fœtus during and immediately after parturition; from which it may be safely inferred that in twelve cases at least, under his own observation, the child breathed and cried after the head was born, while its entire and safe birth was nevertheless subjected to various contingencies.

Next to the hydrostatic test of Hunter, the *nova docimasia* of Ploucquet deserves a passing remark: and a rigid inference from facts compels us to say that the observations which Jaeger has made as to the relative proportions of the lungs and the body of the child, whether male or female, and the difference in the nutrient or vascular capabilities of different individuals in thoracic development, all present conclusive reasons why this test, once thought so beautiful and so legitimate, is still not safely to be admitted as furnishing correct conclusions on so vexed a subject as infanticide. The most conspicuous writers on medical jurisprudence abroad, as well as some of

our own country, have given us the results of their investigations on this test in so convincing a manner, that I shall terminate these casual reflections on the *docimasia pulmonum* with a quotation from a note published in the third edition of Denman's *Midwifery*, in which it will be seen that the inferences of Ploucquet are far from satisfactory, though I estimate this test more favorably than some others who have given us their researches on this notable topic. Since the publication of this edition of Denman, I have had many opportunities of further practical investigation, and the details of thirty subsequent cases might be added; all, however, in no wise impairing the positions set forth in the citation which I here make.

"The hydrostatic test of the lungs, though so ably maintained by Dr. Hunter, has not, I think, advanced in estimation by the latest facts concerning the *docimasia pulmonum*: while I am disposed to yield my conviction that the test of Ploucquet, founded on the absolute weight of the lungs, deserves much higher consideration than it has usually received. I am led to this opinion from the many opportunities of actual observation on the subject which have occurred to me during a period of ten years, chiefly as medical witness and adviser in the criminal courts of the city of New York. The positive evidence which seems to be afforded by the fact that the infant had breathed and lived after its birth, because of the lungs being capable of floating in water, and the reverse of the case, that their incapacity to float in water is proof that the infant was born dead, are invalidated by numerous experiments of several pathological observers; and although the lungs afford proof of respiration, it is no evidence that the infant was born alive. Hunter yields this circumstance, and the occurrence has repeatedly fallen under the notice of accoucheurs. We must ever bear in recollection that respiration is a gradual process; that its first efforts are imperfect, and that there is a remarkable difference in the time of its development in different infants, depending upon the greater or less degree of vigor with which the infant is endowed. Schmitt states, that he has seen the whole thoracic cavity occupied in infants who had not respired; while in the infants who had respired for thirty-six hours, the lungs were so little distended that one could scarcely find them, though they were filled with air. At the trial of a young woman for child murder, at the Warwick assizes, England, which took place some few years ago, this defence, which proved successful, rested upon the principle that the human foetus may respire as soon as the head is expelled in delivery. The medical witness expressed himself

most anxious that 'the minds of the jury should be duly impressed with the important truth that a child may breathe and even cry audibly as soon as the head is delivered, and yet subsequently perish before the whole body is expelled.' See *London Med. Repos.*, vol. xi.

"The emphysematous state of the lungs produced in cases where the child has been suffocated or strangled after birth, deserves to be specially noticed, as well as the peculiar appearances of the lungs, which depend upon air generated by decomposition. But the tardiness of the lungs to run into putrefaction, is a fact familiar to every pathologist and every student in a dissecting room. Ballard examined a child in a state of such putrefaction that its sex could not be discriminated, and the muscles of its face were reduced to a pulp, yet did its lungs sink. I have on several occasions witnessed an equal degree of decomposition in infant bodies whose lungs bore not the least evidence of putrescency by the hydrostatic test. In further corroboration, the following quotation is taken from Camper: 'In order to ascertain to what degree putrefaction would advance in an infant before its lungs would float in water, I made different experiments at Amsterdam on this subject; and I have found that in those who had died before birth the head may be so far decomposed by putrefaction that the slightest force was sufficient to detach the bones from each other, as well as those of the arms and legs, before the lungs, which now began to participate in the putrefaction, would float in water.'

"Rare as cases of diseased lungs are in infants newly born, the instances are nevertheless sufficient to cause us to conduct investigations of this nature with the greatest circumspection. By inflammation we know the lungs acquire additional specific gravity, and hence might sink. In the instance of a child who maintained a sickly existence and died on the morning of the third day after its birth, I witnessed the sinking of the lungs from a morbid congestion, resembling hepatization. Other conditions of the lungs of infants have been seen, as a tuberculous state. Hence the necessity, when we employ the hydrostatic test, of dividing the lungs and experimenting with them in portions. But I am not now discussing the merits of the hydrostatic test;—my present intention is to record some additional testimony in behalf of the knowledge derived from the *nova docimasia* of Ploucquet.

"It appears that the changes effected by respiration in the lungs have shown that these organs undergo a great alteration in their specific gravity by this function; respiration is accompanied with an

increase of the flow of blood to the lungs; hence the pulmonary arteries become dilated, and their ramifications, thus surcharged, augment the volume of the lungs. This change may be deemed permanent: by the increased capacity of the vessels, a larger quantity of blood remains after death, and the real weight of the lungs is increased. This pathological truth was noticed by Ploucquet as early as the year 1777, and is given in his *Commentarius Medicus*, printed in 1786. It would appear, from the observations of Ploucquet, that the weight of the lungs of a full grown fœtus which had never respired, is, to that of its whole body, as *one to seventy*; while in new-born infants, after respiration had been established, it was increased as *two to seventy*, or as *one to thirty-five*. The experiments, however, on which these deductions are founded, are but few in number: in one case, where the new-born child had not respired, Ploucquet found the lungs as 1 to 67. In another case of a mature fœtus, which never breathed, the lungs, in comparison of the body, were as 1 to 70; and in another, where the child was not quite perfect, but had breathed, he found the lungs as 2 to 70. From these few facts, he says: ‘*Videmus exinde, pondus pulmonum ab accedente per respirationem sanguine, et post mortem iis adhuc inhærente duplicari adeoque, in casibus, dubiis hanc normam esse, ope cuius de facta, vel non facta respiratione judicare possimus.*’ (*Comment. Med. in Proces. Crim.*, p. 280.)

“Dr. Hutchinson has offered several arguments and facts which tend to disparage the importance of Ploucquet’s test; and Haartmann has stated that he has not found the relation of the weight of the body to that of the lungs even nearly similar to that mentioned by Ploucquet. Haartmann gives about 48 to 1 as the proportion after respiration has been effected, and about 59 to 1 as that existing before respiration. Struve states that he has found no constant relation between the weight of the lungs and the body under these circumstances; and to these authorities we may add Schmitt. That there is great diversity in the results of experiments on this subject, will be readily admitted; and no stronger proof of it need be given than that drawn from the examinations of Lecieux, of the *Hospice de la Maternité*, at Paris. I shall here give the results of a series of experiments undertaken, as occasions presented to me, for the purpose of ascertaining in the most satisfactory manner the truth.

“In case 1, where it was sufficiently evident that the child had not been born alive, the proportion between the weight of the lungs and the whole body was as 1 to 47. In case 2, of a fœtus at full five

months, the proportion between the lungs and the whole body was as 1 to 29. In case 3, of a fœtus nearly six months, the proportion was as 1 to 39. In case 4, where the child was stillborn, (weight five pounds eleven ounces,) the proportion was as 1 to 52. In case 5, of a fœtus, weight two pounds five ounces, the proportion was as 1 to 40. In case 6, of an abortion at the latter part of the sixth month's pregnancy, the proportion was as 1 to 39 5-7. In case 7, of an abortion at the end of five months' gestation, the proportion was as 1 to 46. In case 8, of an early abortion, time accidentally omitted, the proportion was as 1 to 41. In case 9, an early abortion, the proportion between the lungs and the body was as 1 to 27. In case 10, of a child which had for a few moments respired, the proportion was as 1 to 36. In case 11, of premature delivery at about the eighth month, and where the respiration had been established, the proportion was as 1 to 32. In case 12, of premature delivery at seven months, and in which the child breathed feebly for two hours, the relative proportion of the weight of the lungs to that of the entire body was as 1 to 43. In case 13, an abortion at seven and a half months, the child possessing imperfect respiration some forty minutes, the proportion was as 1 to 43. In case 14, in which the child was stillborn at the full time, the proportion was as 1 to 66. In case 15, an instance of birth at eight months and a half, the child effecting some few imperfect respirations, the lungs were to the body as 1 to 40.

"From these results, I am led to give an opinion that the test of Ploucquet ought to be better known in our criminal courts, and that our jurists might profitably avail themselves of its principles. It will materially aid in the deficiencies of the hydrostatic test of Hunter. But to render the test less uncertain, we ought to know more precisely the relative proportion between the weight of the lungs and the body of the fœtus at different periods of gestation. The celebrated Orfila instituted a series of experiments for the purpose of calculating the relative weight of the lungs, not only as respects the entire body, but as respects the heart; and he frankly acknowledged the impossibility of drawing therefrom any positive inference. The proposed modification of Ploucquet's test, by Daniel, and yet more recently (1821) by Brent, are less available for practical purposes than the test of Ploucquet."

There is another point of inquiry which I believe has scarcely been adverted to by Mons. Billard. I allude to the particular period of gestation at which the viability of the fœtus, or its capability of

supporting extra-uterine life, may be presumed. I recollect the case recorded by Dr. Rodman in the *Edinburgh Medical and Surgical Journal*, of his patient having been delivered at the end of the nineteenth week of pregnancy: to this case I was originally referred by my late colleague in the University, Professor Wright Post, as among the best attested instances recorded of extra-uterine life at so early a period; and such I believe it still stands; though some controversy has arisen as to the correctness of Dr. Rodman's reasoning; the feebleness and size of the child being uncertain data by which to arrive at a positive conclusion; and further, too, as Mr. Baker has subsequently published the case of a child born at the full period of utero-gestation, which corresponded in size very closely with the one made known by Dr. Rodman. I am the more inclined to confide in the accuracy of Dr. Rodman's statement from having seen a remarkable instance of a similar kind. In October last, 1838, I was requested to meet in consultation in a case of retained placenta; the patient, from fatiguing exertions, had been prematurely seized with labor pains, and, after unavailing measures of prevention, was delivered, in the twentieth week of gestation, of a male fœtus, which by distinct respirations sustained life one hour. After death it was found to weigh one pound six drachms: its length was ten inches, and it was well formed. Too many circumstances conspired to render the age of the fœtus doubtful; it was the product of a first conception, and the parties were beyond suspicion.

My friend Dr. Wm. Barrow favored me several years ago with a fœtus which was spontaneously protruded between the seventh and eighth month of gestation, the weight of which was little more than five ounces. The cause of so extraordinarily immature and limited growth at this advanced period, was ascertained to be a disordered condition of the cord, which impaired the fœtal circulation. I give you this case because it is calculated to lead us, in all inquiries of this nature, where we might conclude too hastily as to the age of the fœtus by its bulk alone, to advert to the condition of the cord; inasmuch as an abnormal formation of this connecting link between the mother and child, as well as the sound or disordered development of the placenta, must exercise a controlling influence on the vascular energies, and more or less circumscribe the growth and dimensions of the fœtus. There is much that might be said on this subject, and in Cruvelhier we find a number of observations illustrative of the various causes which disturb that functional reciprocity which in the pregnant state is indispensable to the sound and full forma-

tion of the uterine product. It is worthy of remark that in the case published by Dr. Rodman no notice is taken of any peculiarity in the cord, and in that which I have given its healthy structure was obvious.

I will add another case illustrative of the early period at which extra-uterine life may occur, and in which the viability has secured the subject now some seven years. Mrs. B—— had been delivered, after protracted sufferings, of a dead male child, at the ordinary term of a first pregnancy. Twenty months after, the inconveniences of a second pregnancy were so great that she was on several occasions threatened with abortion. Neglecting the precautions recommended her, she had, during the prevalence of the Asiatic cholera in 1832, indulged in eating freely of Indian corn, which created much annoyance in the stomach and bowels, and in the opinion of several of her friends it was thought that this indulgence was the exciting cause of her premature labor. By one powerful effort the entire ovum was expelled. Arriving at this crisis, I had the whole immersed in a vessel of tepid water, and having rendered the mother more secure and comfortable by a bandage, forthwith ruptured the membranes, when to my surprise I perceived a fœtus, apparently of some five months and upwards of growth. The cord was divided, and more than usual care taken with the child; a fillet or ribbon was applied round its head, which seemed unusually large, and the body wrapped in cotton. By unremitting attention on the part of a competent nurse, the fondest wishes of the parents were ultimately realized, and the daughter, in the enjoyment of excellent health, has, at the present writing, completed her seventh year. Subsequent inquiry with the parents concerned made the age of this premature offspring at birth a fœtus of the twenty-third week of pregnancy.

But I am admonished to terminate this desultory epistle, and conclude with assuring you that the interests of medical knowledge will be greatly advanced by your English translation of Mons. Billard's work.

JOHN W. FRANCIS.

DR. STEWART.

SELECT FORMULÆ FOR INFANTS.

SEDATIVES.

℞ Aquæ destillatæ, ʒj.
Mucil. gum. acac., ʒss.
Syrupi simplicis, ʒss.
Tincturæ opii, guttam.

Dose, a teaspoonful, repeated every half hour, till rest be procured; but after the first month, double that quantity will be required. After the third month, half a drop of laudanum may be given for a dose, one drop at six months, and two after the first year.

Evanson and Maunsell.

℞ Cretæ, ʒss.
Atim. oxy-sulph., gr. iv.
Ext. hyoscyami, gr. xij.
Sacchar. alb., ʒij.

A teaspoonful every two hours in infantile asthma. *Urban.*

℞ Aq. fœniculi, ʒiv.
Vini antimonii, ʒj.
Ext. hyoscyam., gr. iij.
Syrup. althææ, ʒjss.

A teaspoonful every two hours to an infant from six to twelve months, as a cough-mixture. *Vogt.*

℞ Ext. hyoscyam., gr. x.
Vini antim., ʒij.

Eight drops four times a day to an infant a year old, in whoopingcough.

Hufeland.

℞ Ext. belladonnæ, gr. j.
Aq. destill., ʒj.

To infants, five drops four times a day, in whoopingcough. *Wendt.*

℞ Pulv. rad. belladon., gr. iv.

" Doveri, gr. x.

Lac. sulphuris, ʒiv.

Sacchar. alb., ʒij.

M. Divid. in chart., xx.

In whoopingcough, one of these powders every three hours for a child of two years; one fourth for a child of eight or nine months. Between each dose a teaspoonful of the following mixture to a child two years old; to be diminished according to the age of the child:

℞ Aq. chamomile, ʒj
Syrup. simp., ʒij.
Acid. Prussic. Vauquil., gt. xij.
Kahleiss.

℞ Magnes. alb. ust., ʒj.
Tinct. fœtid., gt. lx.
" opii, gt. xx.
Aquæ font., ʒj.

M. Twenty drops to a child from two weeks to one month, in colic; if not relieved in half an hour, two drops more. Increasing the dose as the child advances in age. *Dewees.*

℞ Ext. conii maculat., ʒj.
Tinct. camp. opiat., ʒss.
Syrup. tolu., ʒss.
Aquæ rosar., ʒiv.

M. Dose, half a teaspoonful to a child one year old, in pertussis.

CARMINATIVES AND ANTACIDS.

℞ Magn. carb., ʒss.
Tinct. rhei, ʒj.
Aq. menth., ʒvj.

Syrup alth., $\bar{3}j$.

M. Sit mistura.

S. A teaspoonful every hour for an infant of six months, troubled with acidity of the stomach.

Vogt.

R Magnesiæ, gr. viij.

Sem. anisi cont.

Sem. fœnic. cont., $\bar{a}a$ gr. ij.

Croci, gr. j.

Sacchar. alb., gr. vij.

Contunde bene simul ut sit pulvis.

In tormina of infants, one half to be taken at once, and the remainder in half an hour.

Copland.

R Sodæ sesquiearb., gr. iss.

Pulv. rhei, gr. iij.

Pulv. valerian., gr. j.

S. A powder thrice a day for infants subject to flatulent colic.

R Magn. carb., $\bar{3}j$.

Pulv. rhei, $\bar{O}ss$.

Saponis, $\bar{O}j$.

Ft. pulvis.

S. Ten grains thrice a day for constipation, with acidity.

Berends.

R Magn. carb., $\bar{O}ij$.

Pulv. rhei, $\bar{O}j$.

Aq. fœniculi, $\bar{3}iss$.

Syrup. rhei, $\bar{3}ss$.

M. Sit mistura.

Dose, a teaspoonful.

Berends.

R Aquæ fœniculi, $\bar{3}vij$.

Potassæ bicarb., $\bar{O}ij$.

Syrupi, $\bar{3}j$.

M. A dessert spoonful occasionally.

R Potassæ bicarb., $\bar{3}ss$.

Aq. destil., $\bar{3}iss$.

Solve.

S. Ten to forty drops daily. In infantile convulsions.

Hamilton.

R Potassæ bicarb., $\bar{3}ij$.

Succ. limon. q. s. ad saturationem.

Infus. rhei, $\bar{3}iss$.

Mannæ, $\bar{3}ss$.

One or two teaspoonfuls to infants in gastric disorders.

R Hyd. c. cretâ, $\bar{3}ij$.

Sodæ carb. excicat., $\bar{3}iv$.

M. From six to twelve grs. for an infant.

Copland.

ANTISPASMODICS.

R Cretæ, gr. iij.

Moschi, gr. ss.

Croci, gr. i.

Ft. pulv. dent. tal. dos., No. iv.

S. One every hour for an infant.

Fränkel.

R Moschi, $\bar{O}j$.

Pulv. acaciæ, $\bar{3}ij$.

Tere cum aq. cinnam., $\bar{3}j$.

Syrup. althææ, $\bar{3}iij$.

M. Sit mistura.

S. A spoonful every hour.

R Moschi, gr. vj.

Ammon sesquiearb., gr. iv.

Sacchari albi, $\bar{3}iij$.

Misce terendo et adde,

Aq. for. sambuci, $\bar{3}ijss$.

M. Sit mistura.

S. A teaspoonful every hour in infantile fits.

Wendt.

R Asafœtidæ, gr. vj—viij.

Infus. anthemid., $\bar{3}j$.

Acaciæ, q. s.

M. f. enema.

R Lactis tepefact., $\bar{3}j$.

Aq. menth. pip., $\bar{3}ss$.

Tinct. asafœtid., $\bar{3}j$.

M. Injicienda pro enemata. In convulsions.

EXPECTORANTS AND DEMULCENTS.

R Pulv. ipecac.,

Calomelanos, $\bar{a}a$ gr. x.

Sacchar. albi, gr. xx.

S. One or two grains every second or third hour, as an expectorant in bronchial irritation. *Evanson and Maunsell.*

R̄ Decoct. polyg. seneg., ʒijss.
Oxymel. scillæ, ʒij.
Vini ipecac., ʒij.
Antim. tart., gr. j.

S. Ten minims to a scruple, as an expectorant. *Evanson and Maunsell.*

R̄ Mist. acaciæ, ʒiss.
Aquæ puræ, ʒijss.
Syrupi, ʒss. M.

S. A teaspoonful every two or three hours, for an infant from four to six months old.

R̄ Rad. seneg., ʒss.
Infus. in s. q. aq. fervid.
per ¼ hor. colatur, ʒiv.
Adde,
Ammoniæ hydrochl., ʒss.
Syrup. althææ, ʒj.

A teaspoonful every two hours to an infant. *Wendt.*

R̄ Polygalæ senegæ.
Scillæ, aa ʒj.
Aquæ, ℥j.
Mellis despum., ℥ss.

F. Syrupus, quæquæ uncia ejus addatur.

Antimonii tart. granum.
Coxe's hive syrup.

R̄ Potass tart., ʒj.
Vin. antim., ʒss.
Aquæ anethi, ʒj.
Oxymel. scillæ, ʒss.
Ext. glycyrrh., ʒj. M.

One or two teaspoonsful for an infant of twelve or eighteen months, in catarrhal fever. *Fränkel.*

R̄ Pulv. ipecac., gr. iij.
Pulv. acaciæ.
Magnes. carb., aa ʒss.

Sacchari albi, ʒj.

M. Ft. pulvis divid. in xij æquales part.

A powder every two hours in whooping-cough. *Volger.*

R̄ Pulv. acaciæ, ʒss.
Sacchari purif., ʒj.
Amyli, gr. x.

M. One to be taken frequently. *Kirby.*

R̄ Tinct. opii, gt. j.
Vin. ipecac., gt. iv.
Carb. sod., gr. ij.

To be given in a little sweetened water. For a child between one and two years. *Pearson.*

R̄ Tinct. opii camph., ʒj.
Vin. antim., ʒss.
Suc. glycyrr., ʒij.
Pulv. g. acaciæ, ʒij.
Aq. fervent., ʒvj.

A teaspoonful every two or three hours during the night, to a child six months old, in troublesome cough. *Dewees.*

R̄ Emulsio. amygd., ʒiv.
Syrup. simpl., ʒj.
Gum. tragacanth., gr. vi.

M. To be given by the teaspoonful. *H. des Enf.*

R̄ Hordei, ʒvj.
Gum. acaciæ, ʒj.
Aquæ, ℥ij.

Boil and strain them. Add
Sacchar. alb. q. s.

This is the gummed barley water mentioned in this work.

ASTRINGENTS.

R̄ Hydr. c. cretâ, ʒj.
Pulv. ipecac. comp., ʒij.
Magn. carb., ʒss.
Tere bene simul.

Four to six grains, as a sedative for infants. *Copland.*

℞ Pulv. acaciæ, ʒj.
Solve in.
Aq. fœniculi, ʒj. Adde,
Cretæ, ʒss.
Syrup. althææ, ʒj.

A teaspoonful every two hours, in infantile diarrhœa. *Fränkel.*

℞ Cretæ ppt., ʒss.
Saponis amygd.
Pulv. rhei, aa ʒj.
Hydr. c. cretâ, ʒj.
Ol. fœniculi, m viij.
Sacchar. albi, ʒij.
Tere bene simul.

From six grains to half a drachm twice or thrice a day, in infantile diarrhœa.

Copland.

℞ Hyd. c. cretâ, ʒss.
Pulv. cretæ co., ʒj.
Pulv. tragacanth. co., ʒss.

Divid in partes x æquales. Sumat. 4^a quâque horâ.

In diarrhœa, for an infant of four or six months.

℞ Cretæ ppt., ʒijj.
Tinct. thebaic., gt. xx. vel xxx.
Ol. cinnam., gt. j.
Sacchar. alb., ʒij.
Aq. font., ʒij.

M. A teaspoonful every two, three, or four hours. *Dewees.*

EXTERNAL APPLICATIONS.

℞ Antim. tart., ʒj.
Aq. ferv., ʒj.
Tinct. cantharid., ʒj.

An embrocation, in whoopingcough.

Struve.

℞ Ol. oliv., ʒij.
Ol. succin.
Ol. caryoph., aa ʒss.

An embrocation, in whoopingcough,

℞ Liniment saponis, iss.
Ol. succin., ʒss.

In whoopingcough. These embrocations should be applied both to the chest and along the course of the spine.

℞ Sulph. cupri, ʒij.
Pulv. cinchon., ʒss.
Aquæ, ʒiv.

To be applied twice a day to gangrene of the cheek. *Dr. Coates.*

℞ Sulph. sublim., ʒiv.
Cerat. simpl., lbj.

Used in tinea. *H. des Enfants.*

BATHS.

Potassæ sulphur., ʒij.
Aquæ, lbj.

This bath differs from the artificial Bârege water, in containing half the quantity of sulphuret of potass.

Used in psora. *H. des Enfants.*

Sulph. sublim.
Acetatis plumbi, ā ā ʒj.
Zinci sulph., ʒss.

Used in psora.

H. de la Maternité.

ENEMATA.

Syrup papav., ʒij.
Decoc. amyli, ʒviij

In diarrhœa of infants.

H. de la Maternité.

℞ Cap. papav., No. j.
Decoc. lini, lbjij

H. de la Maternité.

℞ Cap. papav., ʒijj.
Aquæ, lbj.

H. des Enfants.

℞ Amyli, ʒj.
Aquæ, lbj.

H. des Enfants.

℞ Flor. anthemidis, ʒij.
Aquæ, lbj.

Ft. enema. For infantile colic.

PURGATIVES.

R Pulv. rad. jalap., gr. xxiv.
Calomelanos, gr. iv.
Sacchar. alb., ʒij.

M. Ft. pulvis divid in xij partes æquales.

A teaspoonful twice a day for a six months infant, in obstruction of the bowels.
Wendt.

R Calomelanos, gr. iij.
Pulv. rhei,
Oleo-sacch. fœnic., āā ʒj.

Ft. pulvis. One third of the above quantity is a dose for an infant, as a laxative.
Fischer.

R Ol. ricini, ʒiij—iv.
Pulv. acaciæ, q. s.
Aq fœnic, ʒij.
Mannæ, ʒss.
Fiat emulsio.

A dessert spoonful, repeated every hour until it operates.
Berends.

R Ol. ricini, ʒss.
Syrup. rosæ, ʒss.
Vitel. ovi, un.
Tinct. sennæ, ʒiss.

One or two teaspoonsful for an infant.

R Mannæ, ʒss.
Emulsio. Arab., ʒss.
Syrup. violæ, ʒij.
Bene admisce, et adde,
Aquæ menth., ʒj. M.

S. From ʒj to ʒij every third hour, until an effect is produced.

Evanson and Maunsell.

R Infusi sennæ, ʒj.
Aquæ menthæ, ʒss.
Mannæ, ʒij.
Magnesiæ, ʒj.
Tinct. rhei, ʒj.
Syrup. rosæ, ʒij. M.

S. From ʒj to ʒij every third hour.

Evanson and Maunsell.

R Sulph. sub., gr. x—xx.
Mist. acaciæ, ʒij.
Sacchar. alb. ʒss.
Aq rosæ, ʒj.

A teaspoonful hourly, shaking the vial well each time; for an infant in the first year.
Kopp.

R Fol. sennæ, ʒss.
Aquæ ferv., lbj.
Sodæ sulph., ʒss.

To be used as an enema.

H. des Enfants.

R Magn. calcin., ʒss.
Pulv. rhei, gr. vj.
Sacchar. albi, ʒj.
Ol. menth., gt. vj.
Aquæ, ʒiss.

A dessert spoonful every two hours.

H. d'Amer.

R Mannæ, ʒiij.
Ol. amygd.,
Syrup. gum., āā ʒj.

From one to four drachms to be given to young infants, as a mild laxative.

H. d'Allem.

R Decocti hordei, ʒv.
Muriatis sodæ, ʒiij.
Ol. olivarum, ʒv. M.

To be used as an enema.

EMETICS.

R Vini antim., ʒss.
Syrup. althææ, ʒj.

A teaspoonful every quarter of an hour, to a child three or four months old.

Wendt.

R Pulv. ipecac., gr. xij.
Syrup. simpl., ʒj.

A teaspoonful every quarter of an hour, to an infant five or six months old.

R Vin. antim., ʒss.
Oxymel scillæ, ʒij.

A teaspoonful for an infant at the breast.

Fränkel.

R̄ Aquæ, ʒj.
Vini ipecac., ʒss.
Syrupi, ʒss.

One or two drachms frequently, till vomiting ensue.

Evanson and Maunsell.

R̄ Pulv. chel. cancror., ʒss.
Antim. tart., gr. ij.

M. In whoopingcough, one half to two grains, according to the age of the child.

Fothergill.

TONICS AND STIMULANTS.

R̄ Ferri tart., ʒj.
Syrup. simpl., q. s.

M. Ft. bol., No. iij.

As a tonic for debilitated infants.

H. des Enfants.

R̄ Cinchonæ, ʒss.
Aquæ, lbj. M.

To be used as an enema when the stomach rejects cinchona.

H. des Enfants.

R̄ Aquæ destillat., ʒiss.
Quinæ dissulph., gr. ij.
Acid. sulph. arom., gtts. xvj.
Syrupi caryoph., ʒss. M.

From one to two drachms thrice a day.

Evanson and Maunsell.

R̄ Sal. martis, gr. ij.
Acid. sulph., gt. x.
Sacch. alb., ʒj.
Aquæ font. M.

Dose, ʒj, in chronic stage of cholera infantum.

Chapman.

WINE WHEY.

R̄ Lactis vacc., Oss.
Vin. alb., ʒj vel ʒij.

Boil the milk, then add the wine.

EXTERNAL APPLICATIONS.

R̄ Unguent. cetacei, ʒj.
Oxidi zinci,
Pulv. lycopodii, aa ʒss.

Useful in ulceration of the eyelids.

Hufeland.

R̄ Croci sativ., ʒj.
Aquæ fervent., ʒiv.
Vin. opii, ʒj.

Anodyne collyrium. To be used when there is great pain.

Jadelot.

R̄ Infus. sambuci, lbj.
Zinci sulph., ʒj.

Astringent collyrium. Much used in scrofulous ophthalmia, which is usually accompanied with puriform exudation.

D'Huc.

R̄ Hydr. deuto-chlorid., gr. iv.
Aq. puræ, ʒviij.

Used in syphilitic ophthalmia.

D'Huc.

R̄ Rad. althææ, ʒij.
Aquæ, lbj.

Emollient collyrium. Used in inflamed conjunctivæ.

D'Huc.

R̄ Cerat. simpl., ʒij.
Antim. tart., ʒij.
Camphoræ, ʒj.

To be used by friction, to excite the skin; it is a powerful irritant in whoopingcough.

D'Huc.

R̄ Flores anthemidis,
Acet. commun., aa ʒiv.

A common revulsive.

H. des Enfants.

R̄ Cataplasma emoll., lbij.
Ung. resinos, ʒj.

M. Useful to hasten the suppuration of a phlegmonous tumor.

R_x Pulv. lini, q. s.
Decoc. rad. alth., q. s.

M. An emollient cataplasm.

BATH OF BARGÈS WATER.

Potassæ sulphur, 3ij.
Aquæ, lbc.

For psora and other cutaneous affec-
tions.

H. des Enfants.

R_x Cataplasm. emol., ʒiv.
Farinæ sinap., ʒiv.

M. Used as a revulsive.

H. des Enfants.

STIMULANT.

R_x Sp. ammon. arom., ʒss.
Syrup. althææ,
Aquæ fœniculi, ʒj. M.

A teaspoonful for an infant every hour.

Fränkel.

ALTERATIVE.

R_x Calomelanos, gr. iij.
Amyli, ʒss.
Sacch. albi, ʒiss.

M. Ft. pulvis divid. in xii partes æqua-
les.

One thrice a day in infantile syphilis.

Wendt.

DIETETICS.

RICE WATER.

Rice, 2 ounces.
Water, 2 quarts.

Boil for an hour and a half, then add as
much sugar and nutmeg as may be re-
quired.

PANADA.

Wheat bread, 1 ounce.

Cinnamon, 1 drachm.
Water, 1 pint.

Boil them until well mixed, then add
grated nutmeg and sugar.

Another receipt.

Boil a few slices of the crumb of bread
with a blade of mace in a quart of water
about two minutes; then taking the bread
and bruising it finely, mix it with as much
water as will make it of a proper consist-
ence, and sweeten it. If wine be required,
which is seldom the case, it ought not to be
boiled with the water, but should be added
afterwards.

TAPIOCA JELLY.

Tapioca, 2 spoonful.
Water, 1 pint.

Boil it until it assumes an appearance of
jelly, then add sugar, lemon juice, or wine,
if necessary.

PREPARED ARROWROOT.

Arrowroot, 1 tablespoonful.
Sweet milk, ½ pint.

Boil them over the fire a few minutes,
then sweeten them with loaf sugar.

BEEF TEA.

Lean beef in shreds, 1 lb.
Water, 1 quart.

Boil for twenty minutes, taking off the
scum as it rises; when cold, strain.

CHICKEN WATER.

Take half a chicken, divested of all fat,
and break its bones; add to this half a gal-
lon of water, and boil fifteen minutes;
then season with salt.

STARCH WATER.

Starch, 1 ounce.
Cinnamon, 1 drachm.

Boiling water, 3 pints.
Boil until reduced one third, and strain.

TOAST WATER.

Take the crumb of bread toasted, any quantity, and add one quart of boiling water.

WHITE DECOCTION OF SYDENHAM.

Crumb of bread, 6 drachms.
Calcined hartshorn shavings, 2 drach.
Sugar, 1 ounce.

Water, 1 quart.

Boil for a quarter of an hour, and add infusion of canella, 2 drachms.

COMPOUND DECOCTION OF HARTSHORN,
OR WHITE DECOCTION.

Hartshorn shavings, 1½ ounce.

Crumb of bread, 1 ounce.

Water, 1 quart and 1 pint.

Boil until reduced to a third, and add 2 ounces syrup of quinces.

H. de la Ch.

DOSES OF MEDICINE.

Hufeland has drawn up the following scale of the doses of medicine for different ages :

Years.....	25	20	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Doses	40	35	30	29	28	27	26	25	24	23	22	21	20	18	16	13	10
Months...	11	10	9	8	7	6	5	4	3	2	1	½					
	9	8	7	6	5	4	3	2	1								

Suppose the dose at the end of the first year to be 1, then at the fifth it will be 2; at the fifteenth 3; and at the twenty-fifth 4. In the above table the dose for an adult is supposed to be 40 grains.

THE END.





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