CONTENTS.

CHAPTER I.

THE PARTICULATE THEORY OF FERMENTATION.
ON THE FERMENTATION OF BOILED SUBSTANCES.

Definition of putrefaction and fermentation—Chemical fermentations—
Living ferments—Various views on fermentation—Lavoisier—Fabroni—Thenard—Appert—Gay-Lussac's experiments and conclusions—Caignard-Latour—Schwann, heated air inert—Schulze—Ure and Heimholtz, nascent oxygen inert—Liebig's views—Review of the subject—Schroeder and Dusch, filtered air inert—Schroeder, ozone inert—Schroeder's final views—Pasteur's researches—Lister—Roberts—Tyndall—My own results, carbolised air inert—Conclusions as to the cause of the fermentation of boiled substances

CHAPTER II.

THE PARTICULATE THEORY OF FERMENTATION (continued).—
ON THE FERMENTATION OF UNBOILED SUBSTANCES.

CHAPTER III.

ASEPTIC SURGERY-MATERIALS EMPLOYED.

Problems to be solved in order to keep a wound aseptic: Carbolic acid— Carbolic lotions—Pure carbolic acid—Solution in methylated spirit carbolic oil—Carbolic acid and glycerine: Spray producers: Catgut

— Carbolised catgut—Mr. Lister's carbolised chromic catgut—Dr. Mac-
- Carbolised catgut - Mr. Lister's car and nocket case; Carbolised silk:
Ewen's chromic catgut—Catgut trough that P
Protective: Carbolic gauze—Composition
Brun's gauze: Macintosn: Sponges. Solicylic acid cream
Brun's gauze: Macintosh: Sponges. Botacle acid—Salicylic acid cream Boracic lint—Boracic ointment: Salicylic acid—Salicylic acid—Salicylic acid—Salicylic ointment: Chloride of zinc: Iodoform: Carboliséd cotton —Salicylic ointment: Chloride of zinc: Iodoform: Carboliséd cotton
—Salicylic ointment: Chloride of Zinc: Indioform.

DAGE

CHAPTER IV.

ASEPTIC SURGERY (continued).

Example of an aseptic operation: Purification of the skin—Fingers—
Instruments: Spray—Precautions—Probable errors, and mode of remedying them: Guard: Ligature of arteries: Drainage of wounds—
India-rubber tubes—Catgut drains—Horse hair—Decalcified bone tubes
(Neuber's and MacEwen's): Sutures: Button stitches—Stitches of relaxation—Stitches of coaptation—Aseptic strapping—Protective: Deep
dressing: Loose gauze: Gauze dressing: Elastic bandage. CHANGING
THE DRESSINGS—Time—Method. TREATMENT OF ULCERS: Purification of the sore: Boracic dressing: Boracic and salicylic ointment:
Boracic poultice. 67

CHAPTER V.

ASEPTIC SURGERY (continued).

Special dressings: Head dressings: Neck dressings: Breast dressings—
Abscess of mamma—Excision of mamma alone—Excision of mamma
and axillary glands: Axillary dressings: Dressings on the limbs:
Dressings for psoas abscess: Lumbar abscess: Hip-joint abscess:
Dressings in cases of hernia and operations on the scrotum: Excisions
of joints. Aseptic treatment of abscesses. Chief points to be considered in opening abscesses—Method of opening abscesses—Drainage
of abscesses—After-treatment of abscesses—Empyema—Perineal and
anal abscesses. Treatment of wounds produced accidentally: Problem
to be solved—Purification of wound—Further treatment of the wound.
Special wounds: Compound fractures: Wounds involving tendons,
nerves, &c.: Wounds of joints: Compound fractures of the skull: Penetrating wounds of the thorax: Wounds of the abdomen. Putrid sinuses
and wounds. Treatment of burns. Treatment of gangrene. Treatment of nævi and varicose veins.

CHAPTER VI.

ASEPTIC SURGERY-MODIFICATIONS.

Country practice: How to dispense with the spray during the operation and during the after-treatment: How to render the dressings less fre-

CHAPTER VII.

ASEPTIC SURGERY (concluded).

Other methods of carrying out Aseptic Surgery. Substitutes for carbolic acid: Salicylic acid: Thymol: Acetate of Alumina: Eucalyptus oil.

Aseptic surgery by filtration of the air. Subcutaneous surgery. . . 136

CHAPTER VIII.

THEORIES OF SPONTANEOUS GENERATION, HETEROGENESIS AND ABIOGENESIS.

CHAPTER IX.

SPONTANEOUS GENERATION (continued).

The experiments of Jeffries Wyman: explanation of the results: Wyman's views on the subject. Dr. Bastian's views: Cases in which it is still possible that abiogenesis may occur: Growth in vacuo—Bastian's experiments—my own results—Cohn's facts—Dr. Roberts's objections, the walls of the vessels remain impure—Bastian's reply—Objections to the latter—Gruithuisen's experiments—Paul Bert's results with

compressed air—Pouchet looks on a vacuum as preventing spontaneous generation—Paul Bert's results with rarefied air—Dr. Bastian does not always get positive results: Experiments in airless and hermetically sealed flasks raised to a high temperature—Objections—Prof. Huxley's and Dr. Sanderson's statements—Ray Lankester's results—Hartley: experiments with alkaline fluids—Roberts's counter-experiment. Mr. Lister's experiments. Experiments by Roberts and Tyndall . . . 172

CHAPTER X.

SPONTANEOUS GENERATION (concluded).

Facts with regard to unboiled fluids and tissues: Mr. Lister's facts with regard to milk: my own experiments with animal tissues. Present state of the question—Dr. Bastian's latest standpoint: Liebig's doctrine. Can organic molecules derived otherwise than from pre-existing bacteria give rise to bacteria? Firstly, there is nothing unreasonable in looking on these particles as bacteria or their germs: seeds carried by air: excessive minuteness of the germs of bacteria: Mr. Lister's experience with micrococci. Secondly, there is no direct evidence that organic molecules not derived from bacteria can give rise to bacteria: facts with regard to unboiled fluids and tissuesconclusions from these facts: Paul Bert's experiments: Cazeneuve and Livon: Pasteur: Dr. Bastian. Thirdly, there is no evidence that active organic molecules (chemical ferments, &c.) can resist heat more than living things can: effects of heat on ptyalin, pepsin, &c.: my own case of difficulty in sterilising milk: Wyman's fact as

CHAPTER XI,

RELATION OF MICRO-ORGANISMS TO FERMENTATION.

Summary of what has preceded with reference to fermentation. Relation between 'vital' and 'chemical' fermentations: theories of fermentation. Liebig's views. Alcoholic fermentation: Pasteur's experiments and conclusions. Résumé. Butyric fermentation. Formation of pigment by bacteria. Schroeter: Cohn. Viscous fermentation. Lactic fermentation: Pasteur: Lister. Other fermentations, especially the putrefactive: Lemaire; Cazeneuve and Liron: Paul Bert. Conclusions.

CHAPTER XII.

RELATION OF MICRO-ORGANISMS TO THE FLUIDS AND TISSUES OF THE LIVING BODY.

Proposed mode of enquiry—Does the aseptic method prevent putrefaction? Does it exclude organisms from wounds? Ranke's results:

Klebs' objection: Ranke's reply: Demarquay: Fischer: Schüller: my own method-Results in aseptic wounds-Results in wounds treat d otherwise-Koch's method of staining pus-Results in cases not treated aseptically-Examples of complete exclusion of organisms in aseptic cases-Examples of the entrance of micrococci in aseptic cases—Definition of micrococci—Distinctions between micrococci and bacteria. Are organisms present in the healthy living body ?- Bistournage.' Are organisms present in the body in states of disease?-Experiments with ammonia, phosphorus, &c.-The healthy blood and tissues can destroy organisms-Relation of organisms to abscesses. How do micrococci enter aseptic wounds? Carbolic lotion a sufficient germicide; Spray, its value—Stimson's experiments; Gauze dressing as a protection against entrance of organisms; Carbolic acid as a germicide in albuminous fluids; Relations of micrococci aud bacteria to fluids containing carbolic acid.

CHAPTER XIII.

ANTISEPTIC SURGERY.

CHAPTER XIV.

HISTORY OF ANTISEPTIC SURGERY.

CHAPTER XV.

HISTORY OF ANTISEPTC SURGERY (continued)

History of the various methods. Incubation: Guyot. Subcutaneous surgery, preliminary attempts: Stromeyer: Dieffenbach: Jules Guérin: Langenbeck: Other authors. Occlusion: Jules Guérin: Chassaignac — Rochard's remarks: Pansement ouaté — Alphonse Guérin, method and results—Ollier. Substitution of various gases for air: Demarquay and Leconte. Open Method: Bartscher and Vezin: Burow: Humphrey. Healing by scabbing: John Hunter: Neudörfer: Bennion: Lister: Bouisson: Bonnet, &c. Irrigation and the water-bath: early history: Jossé: Bérard: Mayor: Amussat: Langenbeck: Valette

CHAPTER XVI.

HISTORY OF ANTISEPTIC SURGERY (concluded).

Use of antiseptics: Alcohol—older writers—Nélaton—Hutchinson: Glycerine—Demarquay: Chlorine: Chloride of zinc: Iodine: Iodoform: Chlorate of Potash: Perchloride of iron, &c.: Coal tar—Corne and Demeaux—Report of the commission: Coal tar saponiné—Lemaire—his views on putrefaction: Carbolic acid—Lemaire—Lemaire's position n regard to Aseptic Surgery—Lister: Further phases in the history of this subject: Objections to Mr. Lister's claim as originator of the Aseptic method—Simpson—Neudörfer. Modifications of the method. Substitutes for carbolic acid. Objections to the Aseptic method.

CHAPTER XVII.

RESULTS OF ANTISEPTIC SURGERY.

Chief points for consideration. How far do the various methods prevent fermentations in wounds? How to ascertain the true value of any individual method. The value of the various methods in guarding against infective disease: meaning of the term 'infective disease' Relations of Aseptic Surgery to infective disease. Mr. Lister's results in Glasgow. The recent Glasgow statistics. Mr. Lister's results in Edinburgh; results in septic and aseptic cases—Mr. Spence's practice—Mr. Syme's results—Mr. Lister's results at King's College Hospital:—Volkmann—Nussbaum—Socin—Saxtorph—Esmarch—Hueter—Czerny—Lucas-Championnière—Gross—Létiévant—Panas—Schede—Reyher—Spencer Wells—Keith—Thornton. Thiersch's results with salicylic acid. Thymol. The relations of other forms of Antiseptic Surgery to these diseases—Treatment by Antiseptics—Reyher—Lister—Nélaton—Hutchinson. Occlusion—Jules Guérin—Alphonse Guérin. Treatment by irrigation and water bath—Langenbeck—Valette. Open

Method—Bartscher and Vezin—Burov—Krönlein. Results where no antiseptic measures were adopted—Billroth—Malgaigne—Paul—Holnes—Erichsen. Results of cleanliness—McVail—Bardenheuer. 365

CHAPTER XVIII.

RESULTS OF ANTISEPTIC SURGERY (continued).

CHAPTER XIX.

RESULTS OF ANTISEPTIC SURGERY (continued).

Compound fractures. Differences between those produced accidentally and those caused by the surgeon: treatment and after-progress of each class. Tables of accidental compound fractures treated by Mr. Lister: thigh; leg; humerus; forearm; skull; summary of results. Tables of compound fractures produced intentionally by Mr. Lister; femur; leg; clavicle; humerus; forearm; lower jaw. General summary of Mr. Lister's results. Mr Spence's results. Other operations on bones by Mr. Lister. MacEwen's osteotomies: Volkmann: Max Schede: Bardenheuer: MacCormac. Combined aseptic results. Results by other methods. Volkmann and Fraenckel: Holmes: St. Thomas's Hospital. Reyher's results in war. Open method: Krönlein. Septic methods.

CHAPTER XX.

RESULTS OF ANTISEPTIC SURGERY (continued).

ment is Rest .

CHAPTER XXI.

RESULTS OF ANTISEPTIC SURGERY (concluded).

General consideration of the results. Results of the various methods in saving life. Results in avoiding infective disease. Cleanliness: definition of the term: Mr. Savory's definition and method: cleanliness has not abolished infective disease even in healthy hospitals: cleanliness is a complex method: infective disease may appear even in the best hygienic conditions. The source of infective disease. Conclusions as to the value of the various methods in preventing infective disease. Deaths from prolonged suppuration after chronic abscesses, compound fractures, &c. Operations on weak or diseased individuals are rendered possible by the aseptic method. Operations otherwise unjustifiable, but nevertheless necessary for the recovery of the patient, may be safely done by the aseptic method. The patient may be made a more useful member of society: joint cases: tenotomy, &c.: compound fracture: dangers of operations of convenience. Local results of wounds treated aseptically: absence of pain, inflammation, &c.: experiments of Yeo and Ferrier: organisation of blood-clot, catgut, sloughs, &c. Histological details of the process: Tillmann's experiments. Temperature in aseptic cases: contrast with septic cases. Local and constitutional course of cases not treated aseptically. Objections to aseptic surgery: carbolic acid poisoning: the surgeon is said to neglect the constitutional state of the patient: expense: trouble: necessity for the spray. Conclusion: great principle of wound treat-

LIST OF ILLUSTRATIONS.

		P	AGE
1.	Schwann's method of admitting heated air to putrescible fluids.		7
2.	Schroeder and Dusch's apparatus for supplying filtered air .		13
3.	Pasteur's flask with the bent neck		16
4.	Door of Mr. Lister's hot box		18
5.	Mr. Lister's hot box		18
6.	Mr. Lister's large double-necked flasks		19
7.	Method of filling these flasks		20
8.	Mr. Lister's arrangement to protect fluids in liqueur glasses from dus	t	21
9.	Mode of filling Mr. Lister's liqueur glasses		21
10.	Dr. Roberts's bulbs (copied from Roberts)		23
11.	Prof. Tyndall's pure chamber (copied from Tyndall)		24
12.	Dr. Roberts's experiments with grape juice (from Roberts) .		33
13.	Pasteur's method of obtaining fresh blood (from Pasteur)		34
14.	Beaker containing unboiled meat and a putrescible fluid		46
15.	Hand spray producer		54
16.	The ordinary steam spray producer		54
17.	Steam spray producer, showing the lamp at present in use		55
18.	Large steam spray producer with double nozzle for ovariotomy, &c.	•	56
19.	Trough for catgut		59
20.	Lister's pocket catgut holder		59
21.	Machine used in the Glasgow Royal Infirmary for manufacturing	g	
20	gauze		63
	Porcelain trough containing instruments soaking in carbolic lotion	•	70
00.	General arrangement of surgeon, assistants, towels, spray, &c., in a operation performed with complete aseptic precautions	n	71
24.	To show the arrangement of towels, &c., in a large operation		72
	Method of twing vessels in dense tissues		75