

ALCOHOL AND THE HUMAN BODY

HORSLEY AND STURGE

LANTERN-SLIDES

of the Plates and Illustrations in the text of this work, which are copyright and must not be reproduced for sale, have been prepared by the National Temperance League to whom the sole privilege of reproduction has been granted.

Full particulars of cost of sets for purchase or hire may be obtained on application to the Secretary of the League, Paternoster House, London, E.C.

ALCOHOL AND THE HUMAN BODY

**AN INTRODUCTION TO THE STUDY OF THE
SUBJECT, AND A CONTRIBUTION
TO NATIONAL HEALTH**



MACMILLAN AND CO., LIMITED

LONDON · BOMBAY · CALCUTTA
MELBOURNE

THE MACMILLAN COMPANY

NEW YORK · BOSTON · CHICAGO
ATLANTA · SAN FRANCISCO

THE MACMILLAN CO. OF CANADA, LTD.

TORONTO

ALCOHOL
AND
THE HUMAN BODY
AN INTRODUCTION TO THE STUDY OF THE
SUBJECT, AND A CONTRIBUTION
TO NATIONAL HEALTH

BY

SIR VICTOR HORSLEY

F.R.S., F.R.C.S., M.B., B.S. LOND., HON. M.D. HALLE, ETC.,
LATE CHAIRMAN OF THE REPRESENTATIVE MEETING OF THE BRITISH MEDICAL ASSOCIATION
SURGEON TO THE NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC;
LATE SURGEON TO UNIVERSITY COLLEGE HOSPITAL AND PROFESSOR
OF PATHOLOGY IN UNIVERSITY COLLEGE, LONDON, ETC.

AND

MARY D. STURGE, M.D. LOND.

PHYSICIAN TO THE BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN; LATE ANÆSTHETIST
TO THE BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN; LATE
ASSISTANT MEDICAL OFFICER TO THE M.E. FEVER HOSPITAL
OF THE METROPOLITAN ASYLUMS BOARD, ETC.

WITH A CHAPTER

BY

ARTHUR NEWSHOLME, M.D., F.R.C.P., D.P.H.

LATE MEDICAL OFFICER OF HEALTH FOR BRIGHTON, LATE PRESIDENT OF THE SOCIETY OF
MEDICAL OFFICERS OF HEALTH, ETC., ETC.

SECOND EDITION

MACMILLAN AND CO., LIMITED
ST. MARTIN'S STREET, LONDON

1908

“Vigorous health and its accompanying high spirits are larger elements of happiness than any other things whatever, and the teaching how to maintain them is a teaching that yields in moment to no other whatever.”

HERBERT SPENCER.

“For complete living it is necessary that there shall be escaped the incapacities and the slow annihilations which unwise habits entail.”

Ibid.

First Edition 1907
Second Edition 1908

PREFACE TO FIRST EDITION (1907)

IN the preparation of a work of this character, however small, the essential necessity of obtaining the most reliable information is obvious. Fortunately the care and accuracy with which the statistics of our Public Bodies are now kept provides workers in Science with a mine of information which, owing to the public spirit of their officials, has been placed at our disposal.

We are thus indebted to the Asylums Committee of the County of London, to the Metropolitan Asylums Board, to the Infirmary of the Wandsworth Union, to the Salisbury Infirmary, and to the following London Hospitals: St. Bartholomew's, Guy's, Westminster, St. George's, St. Mary's, Middlesex, and University College Hospital.

To Dr. Newsholme, who has contributed the whole of Chapter XVI., and thereby notably enhanced the value of the book, we are especially indebted. Throughout its composition we have also received considerable help from Dr. Mott, Professor Sims Woodhead, Dr. James Miller, and Dr. J. Findlay.

During the passage of the volume through the press we have been greatly assisted by the Rev. Dr. C. T. M'Cready (Dublin), who has kindly read the proofs, and by Mr. William Taylor, to whom we largely owe the compilation of the Glossary.

A special word must be added with regard to the correctness of the illustrations. In a subject like that of the effects of alcohol—regarding which pictorial exaggerations were formerly liable to creep in—accuracy in detail is a matter of great importance. To Miss Kelley our best thanks are due for the fidelity with which she has drawn the specimens, many of which were kindly lent to us by Dr. Mott.

CONTENTS

	PAGE
INTRODUCTION	xxiii

CHAPTER I

ALCOHOL A DRUG

Complexity of drug action—Position of alcohol as a drug— Growth of scientific knowledge and consequent alteration of medical opinion as to value of alcohol—Decrease in amount of alcohol used in hospitals—Coincident increase in amount of milk used—Alcohol a narcotic drug like ether and chloroform—Evidence showing that alcohol is undoubtedly a poison—Conditions which modify the action of a drug such as alcohol: (1) age, (2) muscular exercise, (3) personal idiosyncrasy, (4) habit—Apparent toleration shown by some persons to alcohol—Drugs that induce a craving for repetition	3
---	---

CHAPTER II

THE CHEMISTRY OF ALCOHOL AND OF ALCOHOLIC BEVERAGES

Composition of alcoholic beverages—Preparation of alcohol— Fermentation—Yeast plant—Sources of sugar used in the manufacture of alcohol—Adulterations of alcoholic beverages	
--	--

viii ALCOHOL AND THE HUMAN BODY

	PAGE
—Malt and hop “substitutes”—Distillation—“Still” spirit	
—“Patent” spirit—Wines, fermented and unfermented .	25

CHAPTER III

CELL-LIFE

The cell the tissue unit—Individual cell-life the basis of complex human life—Life-history of amœba typical of life-history of cells in higher animals—Protoplasm—Bodily vitality dependent upon healthy protoplasm—Protoplasmic poisons: lead, alcohol, the toxins of various bacilli, such as the diphtheria bacillus—Action of dilute solutions of alcohol on growth of yeast and other plants—Effect of extremely small doses of alcohol upon lower forms of animal life—This compared with the effect of distilled water . . .	43
---	----

CHAPTER IV

THE NERVOUS SYSTEM

A. *Naked-Eye Anatomy of Brain and Spinal Cord*

Function of the brain as a controlling organ of the whole body —Mental characteristics dependent upon structure of the brain—Factors that interfere with brain development of children.	
The cerebrum or large brain—Brain centres—Sensory-receptive centres: Sensory-motor areas: Gradual acquirement in childhood of control over these areas: This control abrogated by alcohol—Association fibres.	
The cerebellum or small brain.	
The spinal cord and nerves	64

B. *Microscopic Anatomy of the Nervous System*

Nerve corpuscles—Nerve fibres	76
---	----

CONTENTS

ix

CHAPTER V

PART I

EFFECT OF ALCOHOL ON INTELLECTUAL PROCESSES

A. *Effect of Large Doses*

Subacute alcoholism—Severe alcoholism—Alcoholic depression and reaction	PAGE 82
---	------------

B. *Effect of Moderate and Small Doses*

Researches of Professor Kraepelin: Effect of small quantities of alcohol upon the more automatic centres: Preliminary shortening of reaction period, followed by slowing of mental action—Memory tests—Arithmetical tests—Effect of small quantities of alcohol upon the more specialised centres, i.e. those for ideation and reason—Compositors' work with and without alcohol—Fürer's investigation—Faculty of intellectual conception and judgment unfavourably affected by alcohol—Experience of Herbert Spencer: Surgical accidents caused by alcohol—Edinburgh statistics—Slight mental obfuscation an unrecognised cause of accidents and disasters on sea and land—Mental fatigue increased by alcohol—M'Dougall's experiments. Prolonged duration of depressive effect of alcohol—Delusive sensation of increased mental efficiency. Why alcohol has been miscalled a "stimulant"—Effect of alcohol upon the nervous system contrasted with that of tea and coffee	85
--	----

PART II

EFFECT OF ALCOHOL ON THE EMOTIONS

Definition of emotions—Self-control—Controlling mechanism of brain—Effect of alcohol on emotions—Early emotional developments in women, in men—Callousness to human obligations—Loss of power to recall ideals—Alcoholic depression—Alcoholic suicide.	
--	--

x ALCOHOL AND THE HUMAN BODY

Connection between alcohol and crime: Swedish, American, and English statistics—Pleasurable effects of alcohol.	PAGE
Alteration in emotional condition of animals caused by alcohol —Experiments on dogs and kittens	113

PART III

EFFECT OF ALCOHOL ON THE NEURO-MUSCULAR SYSTEM

Motor action due to combined activity of nerve centres and muscles.	
1. Effect of alcohol on the character of neuro-muscular move- ment—Tremulousness.	
2. Neuro-muscular action not increased by alcohol—Experiment on working power of soldiers—Experience of military experts and athletes—Further evidence as to the useless- ness of alcohol as an aid to work-production—Effect of alcohol upon the muscular vigour of dogs.	
3. Tonicity of muscles diminished by alcohol—Violin-playing.	
4. Alcohol and muscular repair—Flabbiness—Experience of athletes—Fatty degeneration of muscle	127

PART IV

EFFECT OF ALCOHOL ON CEREBELLUM

Function of cerebellum in regulating movements—Effect of alcohol upon the precision of movements—Rifle-shooting —Swedish investigations	142
---	-----

CHAPTER VI

DEGENERATION AND DISEASE OF THE NERVOUS SYSTEM DUE TO ALCOHOL

Dipsomania—Insanity and alcoholism—Acute alcoholic mania —Delirium tremens—Chronic alcoholic dementia—Associa- tion between melancholia and alcoholism—Loss of memory —Hysteria—Epilepsy—Convulsive attacks in children— Sunstroke—Neuritis—Alcoholic paralysis—Structural changes due to alcoholism	147
---	-----

CONTENTS

xi

CHAPTER VII

THE ACTION OF ALCOHOL ON THE EXTERNAL SKIN, AND ITS EFFECT ON THE REGULATION OF THE TEMPERATURE OF THE BODY

	PAGE
Blood-vessels dilated by alcohol—Effect of this in lowering temperature—Danger of parting with body heat—Experience of Arctic explorers—Temperature also lowered by chloroform and ether—Illusory feeling of warmth caused by alcohol—Explanation of this phenomenon—Effect of alcohol on the health of the skin	175

CHAPTER VIII

DIGESTIVE SYSTEM

Digestion—Effect of irritants on mucous membrane—Alteration in epithelial protoplasm: in gland secretion: in size of blood-vessels: in amount of mucus secreted—Action of alcohol on the mouth—Taste perception delayed—Flow of saliva and gastric juice stimulated—Alcoholic pharyngitis	187
---	-----

THE STOMACH	196
-----------------------	-----

Section I.—Action of Alcohol on Empty Stomach

A. Local effect of strong solutions: dyspepsia of chronic alcoholics: case of Alexis St. Martin.	
B. Local effect of dilute solutions: gastric catarrh—Interference with digestion of ordinary meals.	
Churning power of stomach delayed by alcohol—Chronic atony: chronic dilatation.	
Doubtful value of alcohol as an internal disinfectant.	
Narcotic action of alcohol—Dyspepsia disguised but not cured—Specially disastrous effect on digestion of women and persons of indoor occupation—Aperients and alcohol	199

xii ALCOHOL AND THE HUMAN BODY

Section II.—Action of Alcohol on Food-stuffs and on the Chemical Process of Digestion

	PAGE
Delaying effect of alcohol in digestion of proteid food-stuffs—	
Test-tube experiments of Sir W. Roberts	211

Section III.—Effect of Alcohol on Digestion when taken at the same time as Food

Three main essentials of normal digestion—Effect of alcoholic liquids on these conditions : Bitters : Wines	217
---	-----

CHAPTER IX

IS ALCOHOL A FOOD?

Definition of genuine food : capacity for oxidation not limited to food-stuffs : poisons oxidisable—Dietetic and non-dietetic substances : undesirable effect of these latter—Alcohol examined as to its power of—(1) Providing bodily energy ; (2) Providing bodily heat ; (3) Building up tissues ; (4) Preventing tissue waste.	
Prevalence of idea that alcohol possesses value as a food—Origin of this mistake—Physiological effect of real food as contrasted with that of alcohol	225

CHAPTER X

THE LIVER AND THE KIDNEY

Effects of alcohol on these organs to be regarded as typical of its effect on other protoplasmic tissues	235
--	-----

THE LIVER

Different types of liver cells—Action of alcohol on—(1) Blood-vessels of liver ; (2) Liver cells proper ; (3) Fibrous tissue cells.	
Scar tissue in liver and other organs.	
Diseases of liver caused by alcohol	236

CONTENTS

xiii

THE KIDNEY

	PAGE
Function of kidney interfered with by alcohol—Diseases which ensue	245

CHAPTER XI

THE BLOOD

Elements of the blood—Function of white blood-corpuscles as microbe destroyers—Blood complement a factor in effective immunisation—Oxygenating power of blood hampered by presence of alcohol—Anæmia of the chronic spirit-drinker	
Leucocytes partially paralysed by alcohol : consequent lessening of their activity in repelling disease—Blood complement diminished by alcohol	249

CHAPTER XII

THE EFFECT OF ALCOHOL ON THE HEART AND CIRCULATION

I.—Effect of Alcohol on Pumping Power of Heart

Paralysis of cardiac nerves—Treatment of restoration from fainting—Value of the action of swallowing—Alcohol and “shock”—Change in medical practice—Alcohol a narcotic and not a “stimulant” to the heart.	
Dilatation of the heart due to alcohol—(1) gradual ; (2) sudden.	
Tissue starvation due to ineffective power of heart—Premature death—Beer-drinker’s heart	261

II.—Effect of Alcohol on the Blood-Vessels

Chronic congestion.	
Alteration in wall of blood-vessels : tissue degeneracy : local hæmorrhages	271

CHAPTER XIII

THE EFFECT OF ALCOHOL ON THE METABOLISM OF THE BODY, AND ON THE POWER OF THE LATTER TO RESIST DISEASE

Metabolic Processes—(1) constructive ; (2) destructive.	
Part played by water and oxygen—Oxidation—Alcohol a cause of deficient oxidation and premature old age.	

xiv ALCOHOL AND THE HUMAN BODY

	PAGE
Habitual use of small quantities of alcohol not without its effect.	
Alcohol technically a source of heat, but an undesirable source — Temperature of body lowered — Defective action of certain glands — Disease induced by altered metabolism — Gout, glycosuria.	
Healing of wounds delayed — Power of resisting invasion of germs diminished — Pneumonia — tuberculosis — syphilis.	
Industrial diseases.	
Action of alcohol in preventing the production of immunity from disease.	
Effect of alcohol on the resisting power of animals.	
Diseases caused by alcohol.	
Table I. Diseases due to alcohol alone.	
„ II. Diseases of which alcohol is frequently a determining or contributing cause . . .	277

CHAPTER XIV

EFFECT OF ALCOHOL UPON THE TISSUES OF CHILDREN

Metabolism in childhood — Effect of alcohol upon the growth of children — Light wines a cause of impaired nutrition.	
Connection between alcohol and disease in childhood — Evidence of Prof. Kassowitz, Sir Thomas Barlow, and Prof. Demme.	
Effect of alcohol on school work — American investigation.	
Convulsions in breast-fed children.	
Alcohol a cause of immorality in youth	305

CHAPTER XV

THE INFLUENCE OF PARENTAL ALCOHOLISM UPON THE RACE

Healthy, embryonic and pre-natal life — Paternal influence on offspring — Maternal influence — Effect of parental alco- holism on the nervous systems of children — Parental alco- holism one of the causes of idiocy, epilepsy, insanity, feeble-mindedness, hysteria, and other neuroses in subse- quent generations — Mental deficiency of school children attributable to inebriety in parents and grandparents — New York statistics — Direct and indirect effect of alcohol	
--	--

CONTENTS

xv

PAGE

in causing infant mortality—Research by Prof. Bunge as to the connection between deficient power of lactation and the alcoholic habit in previous generation.	
Hereditary effects of alcohol studied in animals—Researches with hens' eggs—Influence of heredity on inebriety—	
Special inheritance of nervous instability	315

CHAPTER XVI

(By Dr. ARTHUR NEWSHOLME)

THE INFLUENCE OF THE DRINKING OF ALCOHOLIC BEVERAGES ON THE NATIONAL HEALTH

Standard of life influenced by national expenditure on alcohol	
—Estimation of effect of this expenditure on wage-earning classes—Loss of life due to alcohol—Statistical under-	
statement of number of deaths due to alcohol—Reasons for	
this—Comparative mortality for various trades—Pre-	
valence of consumption and cancer in persons employed in	
certain occupations—Comparative death-rate of abstainers	
and non-abstainers—Incidence of sickness amongst	
abstainers and non-abstainers	345
GLOSSARY	359
INDEX	367

ILLUSTRATIONS

PLATES

PLATE

- I. Diagram showing Gradual Diminution in the Amount of Alcohol Administered in Seven London Hospitals, with a corresponding Rise in the Amount of Milk
face page 6
- II. Diagram showing Comparative Consumption of Alcoholic Liquors in London County Asylums in 1889 and 1905-6
face page 11
- III. Left Half of the Human Brain
" 68
- IV. Diagrammatic Drawing of Association Fibres
" 73
- V. Nerve Cells in Various Stages of Degeneration
" 165
- VI. (1) Normal Cells from "Motor" Area of Brain; (2) Degenerated Cells from the Brain of an Alcoholic
face page 166
- VII. Degenerated Cells from a Ganglion in a Case of Alcoholic Paralysis
face page 167
- VIII. Normal Stomach
" 198
- IX. Stomach of an Alcoholic
" 199
- X. Liver Cells, Normal and Abnormal
" 238
- XI. Drawing of Section of an Alcoholic Liver
" 239
- XII. Normal Liver
" 240
- XIII. Drunkard's Liver
" 241
- XIV. (1) Normal Heart; (2) Fatty Alcoholic Heart
" 268

xviii ALCOHOL AND THE HUMAN BODY

FIGURES

FIG.	PAGE
1. Metropolitan Asylums Board Statistics regarding the Amount of Alcohol Administered to Fever Patients .	10
2. Yeast Cells	29
3. Barley Corn	31
4. Amœba	46
5. Effect of Alcohol on Growth of Cress	54
6. The Brain	65
7. Normal Nerve Corpuscle	76
8. Section of Cerebral Cortex	77
9. Normal Nerve Fibres	78
10. Diagram showing Influence of Alcohol on Work of Com- positors	94
11. Normal Brain Cortex	170
12. Section showing Effect of Alcohol, to contrast with Fig. 11	170
13a. Normal Nerve Fibre	171
13b. Nerve Fibres degenerated by Alcohol	171
14. Diagram of the Alimentary Canal	189
15. Tubular Glands and the Stomach	197
16. Stomach	198
17. Blood Corpuscles	250
18. Muscle Fibres from the Heart	266
19. Diagram showing Relative Death Rate of Adult Males, Publicans, and Abstainers	350
20. Diagram of Insurance Statistics as to Relative Amount of Sickness of Abstainers and Moderate Drinkers .	356
21. Diagram showing Comparison between the Duration of Life of Total Abstainers and Moderate Drinkers .	357

RÉPUBLIQUE FRANÇAISE

LIBERTÉ—ÉGALITÉ—FRATERNITÉ

ADMINISTRATION GÉNÉRALE DE L'ASSISTANCE PUBLIQUE À PARIS

L'ALCOOLISME : SES DANGERS

(EXTRAIT du PROCÈS-VERBAL de la Séance du Conseil de Surveillance
de l'Assistance Publique du 18 Décembre 1902)

(M. le Professeur DEBOVE, Doyen de la Faculté de Médecine,
M. le Docteur FAISANS, Médecin de l'Hôtel-Dieu—Rapporteurs).

L'alcoolisme est l'empoisonnement chronique qui résulte de l'usage habituel de l'alcool, alors même que celui-ci ne produirait pas l'ivresse.

C'est une erreur de dire que l'alcool est nécessaire aux ouvriers qui se livrent à des travaux fatigants, qu'il donne du cœur à l'ouvrage ou qu'il répare les forces ; l'excitation artificielle qu'il procure fait bien vite place à la dépression nerveuse et à la faiblesse ; en réalité, l'alcool n'est utile à personne ; il est nuisible pour tout le monde.

L'habitude de boire des eaux-de-vie conduit rapidement à l'alcoolisme ; mais les boissons dites hygiéniques contiennent aussi de l'alcool ; il n'y a qu'une différence de doses : l'homme qui boit chaque jour une quantité immodérée de vin, de cidre ou de bière, devient aussi sûrement alcoolique que celui qui boit de l'eau-de-vie.

Les boissons dites apéritives (absinthe, vermouth, amers), les liqueurs aromatiques (vulnéraire, eau de mélisse ou de menthe, etc.), sont les plus pernicieuses parce qu'elles contiennent, outre l'alcool, des essences qui sont, elles aussi, des poisons violents.

L'habitude de boire entraîne la désaffection de la famille, l'oubli de tous les devoirs sociaux, le dégoût du travail, la misère, le vol et le crime. Elle mène, pour le moins, à l'hôpital ; car l'alcoolisme engendre les maladies les plus variées et les plus meurtrières : les paralysies, la folie, les affections de l'estomac et du foie, l'hydropisie ; il est une des causes les plus fréquentes de la tuberculose.—Enfin, il complique et aggrave toutes les maladies aiguës : une fièvre typhoïde, une pneumonie, un érysipèle, qui seraient bénins chez un homme sobre, tuent rapidement le buveur alcoolique.

Les fautes d'hygiène des parents retombent sur leurs enfants ; s'ils dépassent les premiers mois, ils sont menacés d'idiotie ou d'épilepsie, ou bien encore, ils sont emportés un peu plus tard, par la méningite tuberculeuse ou par la phthisie.

Pour la santé de l'individu, pour l'existence de la famille, pour l'avenir du Pays, l'alcoolisme est un des plus terribles fléaux.

Vu et approuvé : *Le Préfet de la Seine,*

J. DE SELVES.

Pour copie conforme : *Le Secrétaire Général de l'Administration Générale de
l'Assistance Publique,*

THILLOY.

Le Directeur de l'Administration Générale de l'Assistance Publique,

G. MESUREUR.

FRENCH REPUBLIC

LIBERTY—EQUALITY—FRATERNITY

GENERAL ADMINISTRATION OF RELIEF OF THE POOR IN PARIS

ALCOHOLISM : ITS DANGERS

EXTRACT from the REPORT of the Sitting of the Committee of Supervision
of the Relief of the Poor, December 18, 1902.

Drafted by—

Professor DEBOVE, Dean of the Faculty of Medicine.

Dr. FAISANS, Physician to the Hôtel-Dieu.¹

Alcoholism is chronic poisoning resulting from the habitual use of alcohol, even when this is not taken in amounts sufficient to produce drunkenness.

It is an error to state that alcohol is necessary for workmen who are engaged in arduous manual labour, that it gives energy for work, or that it renews strength. The artificial excitement which it produces quickly gives place to nervous depression and weakness ; in truth, alcohol is useful to nobody ; it is harmful to all.

The habit of drinking spirits leads quickly to alcoholism, but the so-called hygienic drinks also contain alcohol ; the only difference is one of quantity ; the man who daily drinks an immoderate quantity of wine, of cider, or beer, becomes as surely alcoholic as the one who drinks brandy.

The drinks called "aperitifs," (absinthe, vermouth, amers), the aromatic liqueurs ("vulnéraire, eau de mélisse or de menthe") are the most pernicious, because they contain—in addition to alcohol—essences, which are themselves also violent poisons.

The habit of drinking leads to neglect of family, to forgetfulness of all social duties, to distaste for work, to want, theft, and crime. It leads, at the very least, to the hospital—for alcoholism causes a great variety of diseases, many of them most deadly : paralysis, insanity, disorders of the stomach and of the liver, dropsy ; it is one of the most frequent causes of consumption. Finally, it complicates and renders more serious every acute illness ; a typhoid fever, pneumonia, or erysipelas, which would be mild in a sober individual, will rapidly kill the alcoholic.

The hygienic faults of parents are visited upon their children ; if the latter survive the first few months of life, they are threatened with idiocy or epilepsy, or, still worse, are a little later on carried off by tuberculous meningitis or consumption.

Alcoholism is one of the most frightful scourges—whether it be regarded from the point of view of the health of the individual, of the existence of the family, or of the future of the country.

Seen and approved by the Prefect of the Seine,

*Certified by the General Secretary of the General Administration of the Relief
of the Poor,*

The Manager of the General Administration of the Relief of the Poor,

J. DE SELVES.

THILLOY.

G. MESUREUR.

¹ The principal general hospital of Paris.

INTRODUCTION

Two or three years ago copies of the manifesto which appears on the previous page were placarded officially in various parts of Paris. The "posters"—printed in large black print (the sign of their being issued with Government authority)—were affixed to the walls of the waiting-rooms and corridors of hospitals; they were put up in the post-offices and streets of that great city, and upon the outside wall of the Hôtel de Ville (Municipal Buildings) itself.¹

Now it must be observed that it was not by teetotallers that this was done, but by men in the highest public positions in Paris, *i.e.* the Director and Secretary of the Poor Law Administration, the Dean of the Medical Faculty of Paris, and others—men whose work as guardians of the public health brought them face to face with the great problem of how to make France a vigorous and effective nation.

Some of us hardly comprehend what the thought

¹ In France only the State officials are allowed to issue "posters" in black type on white ground. (The speeches of Cabinet Ministers are often ordered to be placarded thus all over the country.) This being the official method, all placards and posters in this type carry with them an authority which ensures their being read carefully.

of "La France" means to an earnest Frenchman. Suffice it to say that anything that indicates weakness in the national physique is to him a matter of serious import, leading him to make efforts (such as the issuing of the placard in question) to increase the physical fitness of his compatriots, so that his country may run no risk of losing its high rank amongst the nations of the world.

The end of the story, alas, possesses elements of human frailty and selfishness. The vendors of alcohol in Paris rose up in indignant protest, declaring that the manifesto was calculated to injure their trade. It was removed from many places, but it was left in certain hospitals and on the wall of the Hôtel de Ville, where we saw it in June 1903. Upon application at the Office of Public Health we were given copies, with a caution not to placard them over England!—the officials hinting, with a smile, not that the facts were at fault, but that the "Trade" in England might make trouble, as it had done in Paris!

It is worthy of note that in France the medical profession has been striving for some time to arouse public anxiety on this matter of the danger of alcohol, a danger which that country as a whole is now beginning to realise.

In England a concurrent advance of medical knowledge and thought has lately been taking place, which has been due to, and kept pace with, the steady flood of scientific light that of recent years has been thrown

upon the subject of the action of alcohol upon the human body, a light which has elucidated facts both new and unexpected. As these various important facts have been discovered, fresh zeal has been inspired and fresh investigations set on foot—new methods and new instruments being constantly devised in order that the investigations might be more effectively carried on. Such earnestness is one sign of the widespread enthusiasm for scientific research which has swept over Europe during the last forty years, transforming both our understanding of whole provinces of natural phenomena and also our methods of dealing with them.

Particularly in regard to the alcohol question, this increase of information and consequent growth of scientific opinion have been most striking. Until recently there has been relatively little accurate, *i.e.* experimental, knowledge upon the subject, and the popular belief that the effect of alcohol was beneficially soothing and stimulating has been accepted without criticism. As an excitant, always ready to hand, it was concluded—this being a matter of pure assumption—that it was a drug of permanent value as a stimulant, and one which any person might use at his own discretion.

Herein lay not only an assumption, but a profound error, the rectification of which has been reserved for the scientific workers of the present day, with more accurate methods of observation and more delicate apparatus of greater exactitude and precision. For

instance, the improvement of the microscope and of histological methods has rendered possible the discovery of changes in organs and cells which fifty years ago were undreamed of; and such discoveries alone are fast altering the whole aspect of the alcohol question.

The interest of men of science in the subject, although at its origin purely abstract, has in some cases developed into a patriotic desire to discover the actual facts about a liquid so largely consumed by mankind, and which, therefore, must inevitably rank as an important factor in the national welfare either for good or evil.¹ Indeed their discoveries have not infrequently had the unexpected effect of making them advocates of temperance reform. For instance, Professor Kraepelin of Munich states that as a result of his prolonged investigations² into the effects of very small quantities of alcohol on the nervous system and the mind he has become "an opponent of alcohol."

Some of the results of this research work we propose to lay briefly before our readers, purposely giving, in the more obscure and complicated parts of the subject, the *general conclusions* arrived at by

¹ In Belgium, the State, realising the great evils wrought by the drinking of spirits, has recently forbidden its sale at all railway stations. This is practicable, because the railways all belong to the State.

"The official *index* of the literature of the alcohol question in Switzerland (including the practical and social questions as well as the scientific investigations) contains 172 pages."—HELLENICUS.

² Made chiefly at Heidelberg.

INTRODUCTION

xxvii

competent observers rather than detailed proofs, which would require far more space than is at our disposal in this volume. For the same reason, in several chapters we have touched upon the elements of physiology with extreme brevity; in others we have omitted them entirely. We may refer the student to one or more small and excellent books for wider study of this part of the subject.¹

Looked at from a purely scientific standpoint, the question of the effect of alcohol is one of fact alone, and not even the tragedies and the poverty which result from its habitual use can prejudice its consideration. Therefore, though all scientific subjects have a grave socio-political and national importance, and none more markedly so than that of alcohol, we propose in this little volume to put forward the present state of knowledge of alcohol solely on the basis of experimental, anatomical, and statistical evidence.

¹ As, for instance, Hill's *Elementary Physiology* (price 1s. 3d., post free), or *Elementary Physiology*, by Ernest Starling, M.D. Lond. (price 1s.), or any other small manual in which the elements of physiology are explained.

INDEX

- Abbott, 256
 Accidents, surgical, 99
 „ frequency on Saturday night, 100
 „ to children, 100
 „ Belgian statistics as to, 100
 Adami, 318
 Age, old, use of alcohol in, 15
 „ premature, 283
 Albuminuria, 246, 271
 Alcohol, preparation of, 27
 Alcoholic epilepsy, 161
 „ insanity, chronic, 155
 „ mania, acute, 153
 „ neuritis, 164
 „ paralysis, 165
 „ pharyngitis, 196
 „ poisoning, acute, 84
 Alcoholism, severe, 83
 „ subacute, 82
 Ale, composition of, 228
 „ nourishment in, 228
 Allbutt, Professor Clifford, 314, 351
 American railways, regulations as to abstinence, 100
 Amœba, 45
 Animals, emotional nature altered, 125
 „ hereditary effect of alcoholism, 336
 „ muscular vigour of, impaired, 138
 „ resisting power of, to disease, 295
 Antiseptic surgery, 8
 Aperients, use of, 209
 Apoplexy, 273
 Arctic explorers, 181
 Aschaffenburg, experiment by, 92
 Association fibres, 73
 Association, cerebral, effect of alcohol in lessening, 96
 Asylums, lunatic, disuse of alcohol in, 10
 Asylums Board, Metropolitan, disuse of alcohol in, 9
 Athletes, training of, 140
 Barley, 31
 Barlow, Sir Thomas, 16, 307
 Barnes, Sir Gorell, 110
 Barr, Sir J., 10
 Bauderon, Dr., 290
 Beaumont, Dr., investigation by, 201
 “Beer-drinker's heart,” 270
 “Beer-drinker's liver,” 238
 Beer-drinkers, work of, 130-136
 Beer, percentage of alcohol in, 26
 „ preparation of, 31
 „ presence of impurities in, 32
 Belgium, accidents in, 100
 Bile, functions of, 236
 „ effect of alcohol on secretion of, 243
 Binz, 229
 Bitters, 220
 Blood, the, 247
 „ -complement, 253, 256
 „ composition of, 249
 „ corpuscles, 250
 „ effect of alcohol on red corpuscles, 255
 „ effect of alcohol on white corpuscles, 255
 „ effect of alcohol on complement of, 256
 „ plasma, 252
 Blood-vessels, alteration in walls of, 272
 „ dilatation of, 271
 „ effect of alcohol on, 271
 „ of brain, 68
 „ of liver, 236
 „ of lungs, 290

368 ALCOHOL AND THE HUMAN BODY

- Blood-vessels, of skin, 178
 „ of stomach, 201
 „ rupture of, 273
 Boers, abstinence of army, 133
 Brain (*see also* Cerebrum, Cerebellum)
 „ activity of, affected by alcohol,
 147 *et seq.*
 „ cells, poisoned by alcohol, 164
 „ „ paralysed by alcohol, 165
 „ „ „ centres,” 69
 „ „ affected by alcohol,
 88
 „ „ sensori-receptive,
 69
 „ „ sensori-motor, 71
 „ controlling mechanism of, 114
 „ highest functions of, 91
 „ of the child, injured by alcohol,
 309
 „ „ unborn child susceptible
 to alcohol, 323
 Breasts, failure to functionate, 331
 Brewing materials, adulteration of,
 33
 „ trade, wages of, 347
 Bright's disease, chronic, 246
 Broadbent, Sir W., 260, 304
 Brouardel, Professor, 344, 353
 Brunton, Sir T. Lauder, 178, 179
 Bunge, Professor, 331
- Caiger, Dr. Ford, 9
 Cancer, 353
 Carbonic acid, 278
 „ „ gas, evolved by yeast
 plant, 30
 Cardiac failure, 261
 „ „ treatment of, 263
 Catarrh, chronic gastric, 204
 „ of throat and lungs, 290
 Cell, the, the tissue-unit, 43
 Cells, specialisation of, 47
 Cerebellum, structure and function
 of, 74
 „ action of alcohol on,
 142
 Cerebral cortex, 68
 Cerebritis, 155
 Cerebrum, structure and function
 of, 68
 „ action of alcohol on, 81
 Chamberlain, Mr. Joseph, 344
 Chemical changes in body, com-
 plexity of, 166
 „ composition of alcohol,
 25
 „ process of digestion, 211
 Chemicals used in brewing, 33
- Children, accidents to, 100
 „ alcohol a cause of convul-
 sions in, 310
 „ alcohol a cause of delirium
 in, 311
 „ alcohol a cause of epilepsy
 in, 326
 „ alcohol a cause of idiocy
 in, 325
 „ alcohol a cause of immor-
 ality in, 311
 „ alcohol a cause of paralysis
 in, 311
 „ alcohol not an article of
 diet for, 306
 „ brains of, injured, 309
 „ cries of, unheard, 116
 „ growth of, 305
 „ mental deterioration of,
 323
 „ metabolism in, 305
 „ neglect of, 100, 115
 „ nervous system of, and
 parental alcoholism, 323
 „ of abstainers, healthier,
 321
 „ resistance to disease les-
 sened in, 306
 „ school work of, 309, 327
 „ stomachs of, special sensi-
 tiveness of, 189
- Chittenden, Professor, 216, 229
 Chloroform, 12
 Chronic alcoholic dementia, 155
 Circulation, 259
 Citizenship, ideals of, lost, 117
 Clarke, Sir Andrew, 2, 130, 234
 Climacteric period, 107
 Clouston, Dr., 20, 62, 108, 144,
 340
 Coffee, 109
 Collier, Dr., 12
 Complement (*see* Blood-complement)
 Compositors, experiment by, 92
 Congestion of abdominal organs,
 183
 „ of blood-vessels of skin,
 182
 „ of liver, 238
 „ of lungs, 290
 Connective-tissue cells, 240
 Consciousness, affected by, 12
 Constipation, use of aperients in,
 209
 Consumption, alcohol a cause of,
 290
 „ spread in public-
 houses, 352

- Convulsions, 160, 311
- Co-ordination, muscular, 74, 140
- Corpuscles, red blood, structure of, 250
 - " red blood, action of alcohol on, 255
 - " white blood, structure and function of, 250
 - " white blood, action of alcohol on, 255
- Cramps, 155
- "Craving," 19, 20, 147
- Cress, growth of, 53
- Crile, Dr., 265
- Crime, connection between alcohol and, 120
 - " English statistics, 121
 - " Swedish statistics, 120
 - " statistics from Massachusetts, 121
- Crothers, Dr., 339-340
- Cumulative action of alcohol, 14
- Darwin, 316
- Death from acute alcoholism, 84
 - " " alcoholic dementia, 157
 - " " dilatation of heart, 269
 - " " exposure after drinking, 178
 - " " fatty degeneration of body, 283
 - " " premature, 269, 284
- Death-rate of abstainers and non-abstainers, 350
- Death-rate from alcohol, statistical understatement concerning, 349
- Deceptive influence of alcohol upon the intellect, 103
- Deceptive influence of alcohol upon the emotions, 105
- Deceptive influence of alcohol in fatigue, 106
- "Degenerates," 326
- Degeneration of blood-vessels, 272
 - " of kidney, 246
 - " of muscle-fibres, 266
 - " of tissues, 283
 - " "fatty," of liver, 240
- Delearde, Dr., 294
- Delirium tremens, 152
- Delusive sensations caused by alcohol, 103
- Dementia, chronic alcoholic, 152, 155
- Demme, Professor, 308, 310
- Depressant, alcohol as a, 116
- Depression, alcoholic, 16, 84, 158
- Deterioration, Committee on Physical, 308
- Deterioration of ganglion cells, 166
 - " of nerve cells, 165
 - " of nerve fibres, 168
 - " mental, arrested by abstinence, 154
- Diabetes, 287
- Diastase in barley, 31
- Dietetic substances, 226
 - " alcohol, 217
- Digestion, conditions necessary for good, 217
 - " gastric, 196
 - " of women, 209
 - " test-tube experiments on, 213
- Digestive system, 183
- Diphtheria, 308
- Dipsomania, 148
- Disease, resistance to, in animals, 295
 - " in man, 294
- Diseases—i. "Due to alcohol alone, 299
 - ii. Of which alcohol is frequently either a determining or contributing cause, 299
- Disinfectant action, 207
- Distemper in dogs, 294
- Distillation, 35
- Disuse of alcohol in fever, 9
 - " " in hospitals, 5
 - " " in insanity, 10
 - " " in London County Asylums, 11
 - " " in medicine, 8
 - " " in surgery, 7
- Dogs, effect of alcohol on, 138, 294, 336
- Drink, money spent on, 345
- Drinkers, prone to disease, 295
 - " children of, 321
- Drink-trade, influence of, 34
- Dropsy, 308
- Drugs that induce a craving for repetition, 19
 - " alcohol a narcotic, 4
 - " complexity of action of, 3
 - " action modified by various conditions, 15
- Drunkard's liver, 242
- Drunkenness, comparable to insanity, 151
 - " Irish statistics as to, 150
- Dukes, Dr. Clement, 312
- Dura mater, 68
- Duration of life, 354
- Dyspepsia, disguised, 211

370 ALCOHOL AND THE HUMAN BODY

Edinburgh Medical Journal, 234

Elimination of waste products, 278, 281

„ of alcohol, 284

Embryonic life, 313

Emotions, effect of alcohol on the, 113

„ in men, 116

„ in women, 115

„ in animals, 125

Enzyme, 28

Epidermis, 175

Epilepsy, alcohol a cause of, 161

„ alcoholic parentage a cause of, 326

Ergograph, 137

Erysipelas, 299

Ether, 12, 181

Eugenics, 315

Excretion, delayed, 279

„ of the skin, 176

Exercise, modifies action of alcohol, 16

Exhilarant effect of alcohol, a delusion, 12

Eyes, fatigue of, 157

„ inflammatory conditions of, 300

Faintness, remedies for, 263

Fatigue, 106

Fatty degeneration (*see* Heart, Liver, etc.)

Feeble-minded children, 323

Féré, Dr., 57

Fermentation, 27

Ferrier, 69

Fever, disuse of alcohol in, 8 *et seq.*

„ enteric, 10

Fick, Professor, 14

Finland, Medical Society of, 133

Fletcher-Beach, Dr., 321

Food, alcohol not a, 228

„ definition of a true, 223

Food-stuffs, action of alcohol on, 211

France, xix

Fraser, Professor, 64

French Republic, xx

Fry, Sir Edward, 146

Fürer, Professor, 95

Galton, Dr. Francis, 311

Ganglion cells, effect of alcohol on, 166

Gin, 27

Glia cells, 169

Glycosuria, 287

Gouge, Mr. H. D., 354

Gout, 296

Granular kidney, 244

Grenfell, General, 131

Growth of children, 302

Guardians of the public health, 5

Habit, quickly formed, 20

„ effect of, 21

Hæmorrhage, alcohol to be avoided in, 107

Haeseler, Count von, 132

Hallucinations, 152

Hare, Dr. C. J., use of alcohol and milk in hospitals, 5

Harley, Dr. George, 276

Health, national, and alcoholic beverages, 345

Hearing, centre for, 69

Heart, action of alcohol on, 259

„ dilatation of, 265

„ failure of, 267

„ muscles of, 264

Heat, alcohol undesirable as a source of, 225

Hellenius, Professor, 1, 118, 120, 135 *et seq.*

Helmholtz, 96

Heredity, 313 *et seq.*

„ and the “craving” for drink, 335

„ a cause of susceptibility to alcohol, 337

Heude, 305

Hill, Dr. Leonard, 260

Hodge, Professor, 42, 52, 125, 138, 296 *et seq.*

Hoppe, 291

Hospitals, disuse of alcohol in, 56

„ London County Asylums, 11

„ Metropolitan Asylums, 8

„ Salisbury Infirmary, 6

„ seven large London hospitals, 5

„ Wandsworth Union, 7

Hydrophobia, death from, 294

Hyslop, Dr. T. B., 112

Hysteria, 160

Idiocy, due to alcoholic parentage, 325

Idiosyncrasy, 16

Illusions, explanation of, 104

Immorality, alcohol a cause of, 311

Immunitisation to disease, 253, 294

Indigestion, 236

Industrial Diseases, 293

Infant mortality, 330

- Inhibitory effect of alcohol on vitality of plants and animals, 51 *et seq.*
 Inland Revenue analysis, 33
 Insanity, 146
 Insanity, alcoholic, 151, 323
 " disuse of alcohol in treatment of, 10
 Insomnia, 154, 155
 Insurance statistics, 349, 354
 Irritability (1) in man, 124
 " (2) in dogs, 127
 Irritant, alcohol a local, 190
- James, Professor, 20
 Jews, temperance of, 316
 Johnson, Dr., 80
 Jones, Dr. Robert, 80, 149, 314
 Judgment, intellectual failure of, 96
 Judicial statistics, 121
- Kassowitz, Professor, 306
 Kerr, Dr. Norman, 319
 Kidney, effect of alcohol on, 245
 " granular, 246
 " structure and function of, 245
 Kitchener, Lord, 132
 Kraepelin, xxvi, 80, 87 *et seq.*, 96, 103
 Kürz, 101
- Lactation, deficient, 331
Lancet, 146, 225, 311
 Lead poisoning, 293, 318
 Legrain, Dr., 157, 186, 316, 322
 Leucocytes, effect of alcohol on, 253
 Liebig, 226
 Lister, Lord, 7
 Liver, action of alcohol on cells of, 237
 " cirrhosis of, 240
 " congestion of, 238
 " drunkard's, 242
 " fatty, 240
 " structure of, 236
 London County Asylums, 11
 Lunacy, statistics of, 149
 " increase of, 144
 " in Ireland, 150
 Lunatic asylums (*see* Asylums)
 Lungs, 289
 Lunier, Dr., 314
- McDougall, Professor, 102
 MacNicholl, Dr., 329
 Magnan, Dr., 127
 Malt, substitutes for, 33
- Malt liquors and gastric digestion, 212
 Mania, acute alcoholic, 152, 153
 Martin and Stevens, biological studies, 262
 Martin, Alexis St., 201
 Massachusetts, Board of Health Report, 34
 " statistics as to crime, 121
 Maternal influence on offspring, 316
 Maudesley, Dr., 151
 Medicine, disuse of alcohol as a, 8
 Melancholia, 158
 Memory, loss of, 90, 159
 Mental fatigue increased by alcohol, 102
 " power, failure of, 155
 " deficiency in children, 323
 Mernetsch, Staff Surgeon, 144
 Metabolism, 118, 275
 " in childhood, 305
 Metchnikoff, Professor, 246, 249, 253
 Metropolitan Asylums Board, 8
 Military experts, 131
 Milk, increased use of, 6
 Miller, Dr. A. G., 99
 Moltke, Von, 24
 Moral sense, deterioration of, 156
 Mortality, comparative, for various trades, 351
 " infant, 33
 Motor cortex, 71
 Mott, Dr., 153, 162, 319
 Mountain climbers, 135
 Mouth, 191
 Movements of stomach, delayed by alcohol, 205, 219
 Mucous membrane, function of, 190
 " irritant action of alcohol on, 191
 Mucus, increased secretion of, 218
 Muira, 229
 Muirhead, 289
 Munro, T. K., M.D., 192
 Muscles, effect of alcohol on (*see* Neuro-muscular System)
 " experiments with ergograph, 137
 " fatty degeneration of heart, 266
 " "tonic" state of, 140
 " wear and tear of, 141
 Muscular energy, effect of alcohol on, 128 *et seq.*
 " experiments on dogs, 138

372 ALCOHOL AND THE HUMAN BODY

- Muscular pain, due to alcohol, 157
 „ weakness, 140
- Nansen, Dr., 181
- Narcotic, alcohol a, 2, 3, 4, 6, 12, 208
- Narcotics, action of, 12, 105
- National expenditure, 346
 „ health, influence of the
 drinking of alcoholic
 beverages on, 343
- Nerve cell or corpuscle, action of
 alcohol on, 165
- Nerve cell or corpuscle, structure of,
 76
- Nerve centres, action of alcohol on,
 81 *et seq.*
 „ development of, 72
 „ position of, 69
- Nerve fibres, 77
 „ degeneration of, 165
- Nerves (cardiac), paralysis of, 263
 „ of stomach, 199
 „ of taste, effect of alcohol on,
 194
- Nervous debility, 107
 „ instability, 160, 339
- Nervous system, 63
 „ „ action of alcohol
 on, 81
 „ „ diseases of, 147
 „ „ size of blood-vessels
 controlled by, 177
- Neuritis, abstinence a cure for, 164
 „ alcoholic, 164
- Neuro-muscular system, 127
- Newsholme, Dr., 343
- Nitrogenous elimination, 276
- Nutrition (*see* Metabolism)
- Obesity, 283
- Offspring, paternal influence on, 314
- Osler, Professor, 276
- Overton, 86
- Ovulation, defective, 286
- Oxidation of poisons in body, 279
 „ a source of heat, 279
 „ delayed, 281
- Paralysis, alcoholic, 165
 „ of cerebral centres, 83
- Paramnesia, 160
- Parental emotions, deadening of,
 116
- Parkes, Dr., 130
- Pasteur, 38
- Patent spirit, 37
- Paternal influence on offspring, 314
- Pawlow, Professor, 220
- Peptic glands, 197
- Percentage of alcohol in beers, wines,
 and spirits, 26 *et seq.*
- Pharmacology, place of alcohol in,
 12, 13
- Pharyngitis, alcoholic, 196
- Pia mater, 68
- Plasma (*see* Blood)
- Pleasurable effects of alcohol, 123
- Pneumonia, 289
- Poison, alcohol a, 13
- Poisons, oxidation of, 280
 „ protoplasmic, 49
- Port wine, 214
- Premature death, 269
- Protoplasm, 47
- Public-houses and the spread of con-
 sumption, 353
- Rabbits, immunity of, 295
- Race, influence of parental alcoholism
 on, 309
 „ of habit on, 21
- Rae, Dr. John, 174
- Railway employees, abstinence de-
 manded of, 100
- Railway, Great Western, gauge
 altered of, 135
- Ramon y Cajal, 77
- Rankin, Dr., 304
- Rauber, Professor, 57
- Reaction-period, effect of alcohol
 on, 88
 „ „ effect of tea and
 coffee on, 109
- Reasoning, power of, 91
- Reeling (*see* Cerebellum)
- Registrar-General, 351
- Repetition of drugs, craving for, 19
- Rheumatic pains so-called (*see*
 Neuritis)
- Richardson, Sir B. W., 56, 58, 179
- Ridge, Dr. J. J., 57, 58
- Rifle-shooting, 141
- Roberts, Lord, 132
- Roberts, Sir W., 213 *et seq.*
- Romeyn, 229
- Ross, Sir J., 174
- Rudin, 101
- Rum, preparation of, 38
- Salisbury Infirmary, expenditure on
 alcohol, 6
- Saliva, 195
- San Francisco, closing of saloons in,
 123
- Saundby, Dr. Robert, 287
- Scar tissue, 239 *et seq.*

- Schäfer, Professor, 180
 Schiller, 96
 Scott, Dr. Alexander, 293
 Self-control, effect of alcohol on, 113
 Senile decay, premature, 171, 283
 Sensori-motor areas, 71
 Sensori-receptive centres, 69
 Sérieux, Dr., 146
 Shaw, Dr. Claye, 98
 Shock, treatment of, 265
 Shuttleworth, Dr., 325
 Sickness, incidence of, in abstainers and non-abstainers, 351
 Skin, action of alcohol on, 175
 " blood-vessels of, 178
 " health of, 182
 " temperature of, 177
 Smith, Dr. Percy, 159
 Soldiers, energy and effectiveness of, 130 *et seq.*
 Spencer, Herbert, 3, 96
 Spinal cord, function of, 75
 " structure of, 75
 Spirits, percentage of alcohol in, 27
 " preparation of, 36
 Starch, in barley, 31
 Starling, Professor, 112
 Sterility, due to alcohol, 286
 Stimulant, wrong use of term, 107
 Stomach, atony of, 207
 " chronic dilatation, 207
 " churning movement, 96, 205
 " digestion by, 196-198
 " empty, effect of alcohol on, 199
 " irritant action of alcohol on, 20
 " action of alcohol on lining of, 191
 " structure of, 196
 Sugar, conversion of starch into, 30
 " ferment action on, 31
 " grape-, 28
 " in barley, 29
 " present in beer, 25
 " sources of, used in manufacture of alcohol, 30
 Suicide, 118
 Sullivan, W. C., M.D., 119 *et seq.*, 322, 326
 Sunstroke causes intolerance of alcohol, 17, 162
 Surgery, disuse of alcohol in, 7
 Susceptibility to alcohol, 7
 Sweet-wort, 32
 Sympathetic system, 75
 Syphilis, 292
 Tanzi, 161
 Taste, perception deadened by alcohol, 194
 Tea and gastric digestion, 215
 " no depressant effect on nervous system, 103, 109
 Temperature of body, 175
 " effect of alcohol on, 177, 285
 " effect of chloroform on, 12
 " effect of ether on, 12
 " how regulated, 177
 Templeman, Dr., 335
 Thought, range of, affected by alcohol, 96 *et seq.*
 Tissue, starvation, 281
 " waste, prevention of, 229
 Tissues, building up of, delayed by alcohol, 228
 " chemical processes in, 278
 " deficient oxidation of, 281
 Toleration, apparent, of alcohol, 18-20
 Tonic state of muscle, 140
 Towns, dwellers in, and alcohol, 16
 Toxines, retained in the system, 118
 Tremor, 130, 157
 Treves, Sir F., 134
 Troops, use of alcohol by, 130 *et seq.*
 Tuberculosis, alcohol a cause of, in adults, 290
 " alcohol a cause of, in children, 291
 " International Congress on, 291
 Typhoid, occasionally followed by alcoholic neuritis, 164
 Ulceration of stomach, 201
 Urea, 278
 Virchow, 42
 Vitality, lowered by alcohol, 15
 Von Moltke, 24
 Wandsworth Union, 7
 Waste, economic, of barley in brewing, 35
 Waste-products, non-elimination of, 282
 " oxidised in body, 278
 " 278
 Water, aerated, effect on digestion, 215
 " natural drink, 278
 Water-fleas, experiments on, 57
 Waterford Lunatic Asylum, 150

374 ALCOHOL AND THE HUMAN BODY

- | | |
|---------------------------------|------------------------------------|
| Weber, Sir Hermann, 2, 260 | Work, effect of alcohol on school |
| Welch, Professor, 288 | work of children, 309, |
| Wells, Sir Spencer, 224 | 324 |
| Whisky, death from drinking, 84 | „ effect of alcohol on, of com- |
| „ preparation of, 36 | positors, 92 |
| Wine, 38 | „ effect of alcohol on, of miners, |
| Wine, effect of digestion, 221 | 136 |
| „ narcotic effect of, 221 | „ effect of alcohol on, of |
| „ not “the milk of the aged,” | soldiers, 130 <i>et seq.</i> |
| 15 | Wounds, delayed healing of, 288 |
| „ percentage of alcohol in, 26 | Yeast, description of, 29 |
| „ preparation of fermented, 38 | „ inhibitory effect of alcohol on |
| „ „ of unfermented, | growth of, 30, 52 |
| 39 | „ use of, in preparation of beer, |
| Woodhead, Professor Sims, 272 | 32 |
| Women, effect of alcoholism on | Ziemssen, Von, 13 |
| digestion of, 209 | |
| „ growth of alcoholism | |
| amongst, 320 | |

THE END

MEMORANDUM

PRESENTED BY

THE COMMITTEE OF THE MEDICAL PROFESSION

THE BRITISH MEDICAL ASSOCIATION

AND BY

THE BOARD OF HYGIENE AND TEMPERANCE

TO THE

PRESIDENT OF THE BOARD OF EDUCATION,

1906

IN FURTHERANCE OF

TEACHING IN HYGIENE AND TEMPERANCE.

To be obtained from

LONDON: SIMPKIN, MARSHALL, & CO., LTD.

BIRMINGHAM: CORNISH BROTHERS.

MANCHESTER: JOHN HEYWOOD.

AND OF ALL BOOKSELLERS.

PRICE SIXPENCE.