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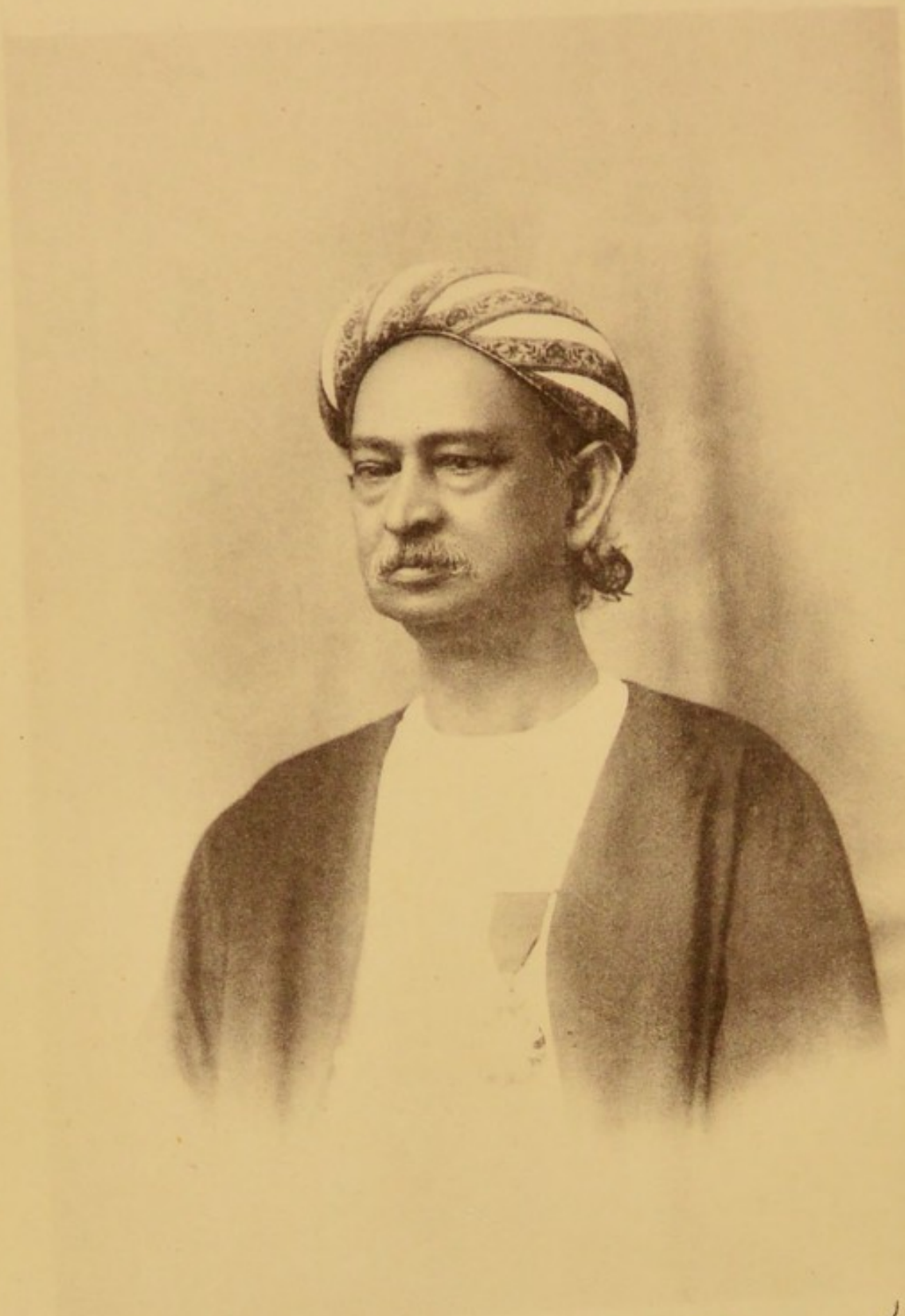
THE INDIGENOUS DRUGS
OF INDIA.



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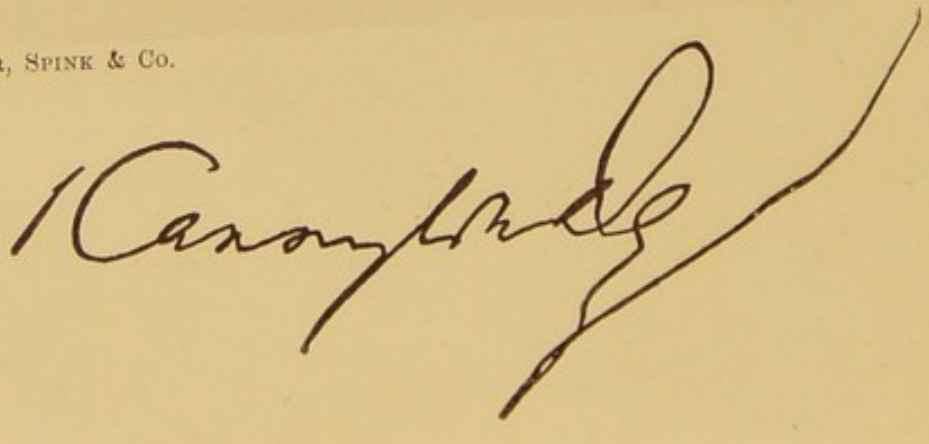

THE INDIGENOUS DRUGS OF INDIA:

SHORT DESCRIPTIVE NOTICES OF

THE PRINCIPAL MEDICINAL PRODUCTS MET WITH IN BRITISH INDIA:

BY

KANNY LALL DEY, RAI BAHADUR, C.I.E., F.C.S.,

Late Professor of Chemistry and Chemical Examiner to Government;
Honorary Member, Pharmaceutical Society of Great Britain;
Joint President, Section of Pharmacology, Indian Medical Congress, 1894, etc.

ASSISTED BY

WILLIAM MAIR,

Associate of the Pharmaceutical Society of Great Britain.

SECOND EDITION.

Revised and Entirely Re-written.

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Dedicated,

WITH PERMISSION, TO THE

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN

IN RECOGNITION OF THE EFFORTS WHICH

THE SOCIETY HAS FOR MORE THAN 50 YEARS

DEVOTED TO THE ADVANCEMENT OF

PHARMACEUTICAL AND PHARMACOLOGICAL KNOWLEDGE,

AND AS A HUMBLE TRIBUTE OF RESPECT.

KANNY LALL DEY.

PREFACE.

No surer indication of progress could be cited than the awakened interest in the subject of India's Indigenous Drugs, witnessed within the past few years. In 1826 Ainslie published the *Materia Medica of Hindustan;* in 1844 O'Shaugnessy produced the Bengal Pharmacopœia; and in 1868 Waring issued the Indian Pharmacopœia. These monumental works are replete with particulars regarding the drugs of India. They give expression to a rich store of personal investigation and to laborious compilation from an army of contemporaries, in the more direct field of botany, of whom mention need hardly be made of such names as Jones, Roxburgh, Wallich, Buchanan-Hamilton, Griffith, Graham, Fleming, Royle and Wight. But with the establishment in India of Universities and Medical Schools where European medical science was taught there soon arose an army of pupils not unworthy of their great masters. In the field of pharmacology no names are more distinguished than those of Kanny Lall Dey, author of

The Indigenous Drugs of India, published in 1867 ; Moodeen Sheriff, *Supplement to the Pharmacopœia of India*, in 1869 ; and U. C. Dutt, *The Materia Medica of the Hindus*, in 1877. Dr. Dey's two contemporaries have passed away, but they have left to the rising generation the legacy of a still vastly unexplored field of research. A veteran in both years and knowledge Dr. Dey still leads his countrymen forward. He has revised and greatly improved his *Indigenous Drugs of India*, and presents it to the public in a form in which it may fairly well claim to become a text-book in our Medical Schools. He has been pleased to place the proofs of this revision in my hands. I have looked through these with much interest. It has surprised me greatly to find how thoroughly and accurately he has compressed into the limited scope proposed for his work the more valuable and recent information regarding the chief drugs of India. His hand-book does not of course profess to supersede the great works that have appeared recently on that subject. The *Pharmacographia Indica* of Dymock, Warden and Hooper must continue to be in the hands of all interested in Indian drugs. Dr. Dey's book has been written for students, and as such is eminently suitable.

He has rightly recognised that the expression "Indigenous Drugs" if employed too literally would have excluded a distinct percentage of the drugs that enter very largely into every-day practice. Many of the so called indigenous drugs can be shown to be

introduced plants completely naturalised. Others, such as Cinchona, are cultivated in India, and therefore should find a place in an Indian student's manual. But there is a still more arbitrary restriction forced sometimes on the expression "Indigenous Drugs" that would exclude from that position all the drugs that appear in the British Pharmacopœia even although India may be the country of the world's supply. Dr. Dey has not accepted that view, and accordingly deals with all the drugs procurable in India whether they be indigenous to this country or not.

As a strong advocate of a more extended substitution of locally-procured drugs I hold with Dr. Dey that the advantage may not be so much in the financial saving to the country as in the more extended use of serviceable drugs. No one who has looked into the question of the remedial agents sold in the village drug-shops can disguise from himself the conviction that many, in fact the majority, are worse than useless. The few that are good are neglected, and largely so because the cry for imported drugs and European pharmacy is obliterating all knowledge in the time immemorial experience of the useful drugs of this country. Dr. Dey has wisely eliminated the useless and concentrated attention on the valuable. His work is a compendium of forty years' experience and deserves to be widely popular and carefully studied.

GEORGE WATT.

CONTENTS.

PREFATORY MEMOIR.

KANNY LALL DEY.

It has appeared to the writer that a sketch of the public and professional career of the author of this work may be of interest to many readers. The present memoir, necessarily brief, deals almost exclusively, in accordance with the expressed wish of its subject, with those outstanding events in his life relating more or less directly to that portion of his life's work which gives the title to this volume.

Kanny Lall Dey was born in Calcutta in 1831, so that he is now in his sixty-fifth year. His father, Rai Radhanath Dey, was a Deputy Collector. By some favouring chance, unlike most men, young Kanny Lall discovered early the peculiar bent of his mind, and he was fortunate in the opportunity of following its directions. His aptitude for chemistry and medical jurisprudence, while yet a diligent and successful student of the Calcutta Medical College and winner of some of its most coveted prizes, marked out these departments of science as his speciality. The proud possessor eventually of the College diploma, a real distinction in those pre-University days, and at the age of twenty-two, he entered Government service as a Sub-Assistant Surgeon with the Bengal Medical Establishment, and was at once appointed as Assistant to the Professor of Chemistry and Chemical Examiner

to Government in the Calcutta Medical College, a position which he held with much acceptance till 1869. In 1862 he was also appointed Professor of Chemistry in the Presidency College, Calcutta. During a portion of the same year he officiated, during the absence, on furlough, of Dr. F. N. Macnamara, as Professor of Chemistry and Chemical Examiner to Government, and again acted in the same capacity in 1877. In 1867 he was appointed Additional Chemical Examiner to Government, a position which he retained till 1872.

In 1869 he was appointed Teacher of Chemistry and Medical Jurisprudence to the vernacular classes in the Calcutta Medical College, which appointment he continued to hold until his retirement from Government service in 1884. His tutorial record concludes with an Examinership in Medical Jurisprudence and Chemistry, to which he was appointed by the Syndicate of the University of Calcutta in 1878, and subsequently till 1891. The great want in those days of suitable text-books in the vernacular induced Dr. Kanny Lall to undertake the preparation of several, including translations of some standard works into Bengali, which appeared from time to time.

Throughout this long and active professorial career, and in brief intervals of leisure snatched from busy days, his private medical practice gradually increasing meanwhile, the Doctor had given his attention to a study, till then much neglected—the medicinal resources of his native land—which was destined to be the field in which he has won most of the distinction to which he has attained.

The great commercial value of International Exhibitions, and their educational and economic interest, had been demonstrated by the Great Exhibition of 1851, originated and promoted by Albert the Good ; and to the second

International Exhibition, held in London in 1862, Dr. Kanny Lall Dey was invited to contribute by the Government of India. He forwarded a collection of indigenous drugs and medicinal oils, for which he was awarded two medals.

A catalogue which he prepared to accompany this Exhibit was the nucleus of the first edition of the present work, prepared at the instance of the then Inspector-General of Hospitals, and published in 1867, of which the Government of India was pleased to purchase 600 copies. He contributed about this time a number of articles on the therapeutics of Indian indigenous drugs to the *Pharmacopœia of India*, then in course of preparation, the Editor's acknowledgments being duly recorded in that work. Another drug collection, contributed in the same year to the Paris Exposition Universale, brought him a gold medal and certificate of honour, while a subsequent collection sent to Paris, to the great Exhibition of 1878, for which he was similarly rewarded, earned for him in addition the congratulations and thanks of the Viceroy, for his services in developing the drug resources of the country. This collection was ultimately presented by Dr. Kanny Lall Dey to the Museum de Pharmacie of Paris, for which he received the acknowledgments of the French Government. Among other similar collections which may be enumerated, omitting many local to India, are :—one forwarded in 1870 to the University of Virginia, U. S., for which he received the thanks of the Senate; and others, to the Vienna Exhibition of 1872, for which he received a gold medal, a diploma and two certificates of honourable mention; the Melbourne Exhibition, 1880; the Amsterdam Exhibition, 1883; the World's Centennial Exposition, New Orleans, U. S. A., 1884-85; and the Colonial and Indian Exhibition, London, 1886, for all of which he has been suitably rewarded

his bright study is decorated with diplomas and memorials of past achievements. In this connection may be recorded also the fact that he was selected by the Secretary of State, in 1874, to make a collection, to which he devoted two years, of the drugs of Bengal in illustration of the *Pharmacopœia of India* for the Museum at Netley Hospital, for the benefit of surgeons joining the Indian Medical Service. It has perhaps been all too little made use of. He would wish to see a knowledge of Indian *Materia Medica* taught in the training schools of India's medical officers. In 1877 he prepared, under the orders of Government, five complete sets of the indigenous drugs of India for the five medical schools of Bengal, for which he received the thanks of Government.

A graceful acknowledgment of his services in thus helping to further the economic progress of India was his appointment, in 1872, to the Permanent Committee for the collection of Indian products for the Kensington and Vienna Museums, and later, in 1874, to the Select Committee appointed on the occasion of the foundation of the Museum of India at Calcutta. He acted as juror in no less than fifteen sections at the Calcutta Exhibition of 1883-84.

Some of the rewards and distinctions that have been bestowed upon him may now fittingly be recorded. The Pharmaceutical Society of Great Britain recognised, as early as 1863, his abilities as a pharmacognosist by electing him an Honorary Member, "a distinction which is reserved," as the influential *Chemist and Druggist* lately observed, in an appreciative memoir of our subject (27th January 1894), "for the world's fifty most eminent men of science related to pharmacy." He is at present the only Honorary Member of the Society in India. He has made occasional original contributions to the *Pharmaceutical Journal.* The President of the Society, Mr. Michael Carteighe, F.C.S., has been

pleased to accept, on behalf of British pharmacologists, the dedication of this book to the Pharmaceutical Society.

The next honour, in chronological sequence, was that of the then much coveted title, Rai Bahadur, bestowed in 1872, "in recognition," according to the *Gazette*, "of valuable services rendered to the cause of medical science in India." The *sunnud* or title-deed of distinction, was presented at the Medical College, before a large and enthusiastic gathering of the medical profession and *alumni* of the College, the London *Times* of 3rd October 1872, reporting that "the Native press is quite enthusiastic on the subject. The title is equivalent to our order of Knighthood, and is highly estimated in India." On the occasion of Her Majesty's assumption of the Imperial title he received a certificate of honour from the Hon'ble Sir Richard Temple, K.C.S.I., then Lieutenant-Governor of Bengal, in recognition of his services to the State as a practical chemist and teacher of chemistry. In 1867 he was elected a Fellow of the Calcutta University.

In 1880 the Rai Bahadur was elected a Fellow of the Chemical Society of London, and in the same year a Fellow of the Society of Science, Letters and Arts of London. Nor have foreign scientists failed to recognise his ability. In 1886 he became a corresponding Fellow of the College of Physicians, Philadelphia. He was invited to represent India at the International Pharmaceutical and Medical Congress held in London in 1881. It is perhaps to be regretted that religious prejudice, a stronger influence then than now, should have prevented him from crossing the "black water," but he sent the results of some original observations which were published in the Proceedings. At the close of thirty years of continuous Government service, on his retirement in 1884, he was decorated with the

dignity of a Companion of the Most Eminent Order of the Indian Empire, "in recognition of valuable services rendered to Government and of his professional and scientific attainments." It may be noted that at that time he was the only Indian medical practitioner, with one exception, on whom this high distinction had been conferred.

Such is the record of good work well done, a record of patient perseverance and gradual progress, a life of industrious research lived in the interests of his fellow countrymen and an admirable example of quiet and cultured effort towards a high ideal of usefulness. Rai Kanny Lall has now retired from the extensive medical practice which he rapidly acquired on his relinquishing Government service but he remains, as he has always been, a student, and his time is mainly devoted to clinical chemistry and its application in medical diagnosis, while maintaining his intimate acquaintance with the literature of his favourite studies. His services as a physician are still frequently requisitioned by old and grateful patients, and he is retained as medical adviser by several of the princely families of Calcutta. Nor is his well-earned leisure unencroached upon by official obligations (we omit entirely his honorary, judicial and municipal appointments). He was called upon to give evidence before the Hemp Drugs Commission held in India in 1894, and before the recent Royal Commission on Opium. His election to the Joint-Presidentship of the Indian Medical Congress, held at Calcutta in Christmas week of 1894, was a graceful tribute on the part of the medical profession in India. The address on "Indian Pharmacology," which he delivered on that occasion, reproduced in these pages, was honoured with important editorial notices in the three leading daily newspapers of Calcutta, and was in part the subject of a resolution by the Government of India in

Council at Simla in the following year. The following is an excerpt from the text of the resolution :—

"In the section of Pharmacology and Indian Drugs of the Indian Medical Congress, eight papers were read on the use of indigenous drugs, the most important being those by Dr. G. Watt, M.B., C.M., F.L.S., C.I.E., and by Rai Bahadur Kanny Lall Dey, F.C.S., C.I.E. In his paper on the subject, Dr. Watt enumerated the names and reputed properties of the drugs indigenous to India, and urged the desirability of greater attention being given to the study of such drugs, and Rai Bahadur Kanny Lall Dey made the following suggestions :—

(1) that definite pharmacological preparations of certain indigenous drugs should be made at the Medical Store Depôts for distribution to the various hospitals and dispensaries for trial and report ;

(2) that medicinal plant farms should be laid out in the districts most suited to the plants which it is proposed to grow ; and

(3) that a drug emporium should be established at Calcutta."

With the view of considering these suggestions in a practical way and the question of the extended use of indigenous drugs, the Government of India appointed the Indigenous Drugs Committee, consisting of—Dr. George King, C.I.E., Dr. J. F. P. McConnell, Dr. C. J. H. Warden, Dr. George Watt, C.I.E., and Dr. Kanny Lall Dey, C.I.E., which will not have completed its sittings ere this book is in the hands of the public.

The Doctor has read widely of the literature of the day : he loves knowledge for its own sake, and he has written, during the years that have passed under review until the present time, numerous papers which have appeared in the Indian medical journals on the subject of indigenous drugs and on toxicological and therapeutical topics, while he has contributed some enlightened writings towards the reform of Hindu sociology. He is deeply religious, and although a staunch adherent of the Brahaminical

faith, is not conservative: he has a fine conception of true religion in its highest and most practical ideals. His dignified bearing, courteous and gentlemanly demeanour, begotten of his long-continued, intimate intercourse with men of eminence in official and professional circles, his perfect command of the English language, allied to the subtle perception innate to the Bengali, and his sterling integrity of character, are distinguishing personal characteristics which have won for him the respect and esteem of his many friends—European and Indian.

It is pleasing to record that he is privileged to retain the friendship of many distinguished men who were his colleagues and superiors in former years, now in well-earned retirement 'at Home.'

"Folly loves the martyrdom of fame,"

but Rai Kanny Lall Dey's name is writ permanently in the estimation of his countrymen, and it will live in his Fatherland he has served so long and so well. May he be spared for many years to come in the satisfaction of having contributed his quota to his country's greatness.

W. M.

INTRODUCTORY.

ALTHOUGH frequently and strongly urged by professional friends and by the publishers, to re-issue or re-print this work, since the publication of the first edition in 1867, the author has deferred arrangements for the preparation of a new edition until the present time, chiefly because the field was worthily occupied by other students, some of whom had better facilities and more opportunity for original research at their command. The interval has produced the *Pharmacopœia of India*, a work which, ostensibly a compendium of all that was reliable about important indigenous drugs, though admitted to be imperfect and inadequate, has now become not only practically obsolete, but is neither an official nor a legal standard. It has also seen the issue of the *Dictionary of the Economic Products of India*, and of the *Pharmacographia Indica*, works which are classical, but which may almost be said to be inaccessible, by reason of their voluminousness.

The continued demand of the public, however, for this work seemed to indicate that the want of a convenient manual, not intended to replace larger works, but embodying the most essential, reliable and recent information, still remained unfilled. The present edition is an attempt to supply that want: it is a *résumé* of the great mass of information which has become available during

forty years of study which the author has given to the indigenous medicinal products of this country, and it is believed that it may form a useful guide to the important and extensive subject of which it treats. The original work extended to 130 pages : the present edition has been entirely re-written and considerably enlarged.

The marked and increasing interest which has been manifested during recent years, on the part of all grades of the medical profession in India, in the subject of indigenous drugs, leading up in some measure to the establishment of a successful section devoted to Pharmacology and Indigenous Drugs at the late Indian Medical Congress, and its still more practical outcome—the appointment of a Commission, by the Government of India, " to consider the desirability of extending the use of indigenous drugs in India"—have together suggested the present as a suitable opportunity for the publication of this work in its present form.

It will be evident that the limits of space have precluded the possibility of the enumeration of any but the more prominent facts relating to each article, and those of a general and economic, rather than a purely scientific application. The information recorded has been compiled, as far as possible, from actual acquaintance with individual substances and from personal experience : it was originally intended to have given in this edition descriptions in popular language of the principal drugs available, at least in Bengal, but this was ultimately abandoned, except in regard to some essential distinguishing features, since the characters are in many instances not so marked or so constant as to be readily identified by verbal description, and since any particular article ordinarily available in the bazár may be readily obtained by the use of the vernacular names, given throughout the text in more or less phonetic expression—consider-

ations which may explain apparent shortcomings in the department of pure pharmacognosy.

While a number of medicinal substances of minor importance, comparatively, have necessarily been retained, much that is primitive, empirical and irrational, and much that is obsolete, although still honoured with a place in modern works on Indian *Materia Medica*, has been judiciously eliminated in the present volume. The work, on the other hand, while devoted to products of indigenous origin as distinguished from imported, would have been obviously incomplete but for the inclusion of several—*e. g.*, Cinchona—which are not indigenous in the correct sense of the expression, but which, nevertheless, are important products of cultivation, while many so-called indigenous are believed to be introductions of more or less obscure origin.

The results of the newest chemical researches on Indian medicinal products, concluded to the beginning of the present year, have been embodied in the work, together with references, in most instances, to the original communications: a considerable number have not hitherto appeared in any work dealing with the subject, and several are published for the first time. The painstaking labours in this connection of Surgeon-Lieutenant-Colonel C. J. H. Warden, M.D., F.C.S., and Mr. David Hooper, F.C.S., F.L.S., have probably left little of much importance in the domain of Indian pharmacology that is still unisolated. The line of research that probably offers more scope for the prosecution of this difficult branch of the study by chemical specialists—difficult, since plant analysis is still largely empirical—is the investigation of the probable identity of some of the active principles which are now regarded as distinct. This has been indicated in the comparatively

recent discovery of the isomerism of hyoscyamine and atropine, and the subsequent discovery of the identity of hyoscine with scopolamine, and emphasised in Hooper's recent work on *Ailanthus excelsa* (Appendix, p. 340), while the newer chemistry of croton oil (page 103) indicates another profitable line of research—that of re-investigating presently accepted principles.

The classical names have been adopted at the head of each article as being the most universal: cross references have been provided where established names have been superseded by newer botanical nomenclature, that of the *Flora of British India* having been followed throughout the work. The alphabetical arrangement, if not the most scientific, was adopted after careful consideration as being the most popular, and as following the design of the original work; other names and synonyms will readily be found on a reference to the Index, which will be found to be fairly copious.

A plan has been devised, it is believed for the first time, and embodied in an Appendix—*viz.*, the suggestion of pharmaceutical processes for the efficient exhibition of the medicinal products herein enumerated, for the purpose of therapeutic investigation and practice.

The author would take this opportunity of recording his cordial acknowledgments for much valuable assistance most willingly rendered by the following gentlemen:—

Brigade-Surgeon-Lieutenant-Colonel George King, M.B., F.R.S., F.L.S., LL.D., C.I.E., *Superintendent of the Royal Botanic Garden, Calcutta;*

Dr. George Watt, M.B., C.M., F.L.S., C.I.E., *Reporter on Economic Products to the Government of India;*

Mr. David Hooper, F.I.C., F.C.S., F.L.S., *Quinologist to the Government of Madras, Ootacamund;*

Mr. Trailokhya Nath Mukharji, f.l.s., *Assistant Curator, Economic and Art Section, Indian Museum, Calcutta;* and to his friend and colleague, Mr. William Mair, to whom has fallen the task of editing the work and seeing it through the press.

Dr. King has revised and corrected the Botanical Classification. Dr. Watt's profound knowledge of the subject renders the Preface which he has contributed specially valuable. Mr. Hooper, in the course of a careful scrutiny which he has made of the proof-sheets as they have passed through the press, has added some important chemical facts and thus greatly enhanced the usefulness of the work. Mr. Mukharji has also revised, with much care, the proofs of the text and has made many valued emendations and additions which only his intimate practical acquaintance with the subject has rendered possible. The courtesies of several other friends have been acknowledged in the text.

For valued counsel regarding the present publication and for the friendship and sympathy extended through many years by Dr. F. J. Mouat, Dr. F. N. Macnamara, and Sir Joseph Fayrer, Bart., the author desires to record in this place his sincere and grateful acknowledgments.

To his son, Preo Lall Dey, f.c.s., and to his nephew, Assistant-Surgeon Roma Nath Dey, m.b., who have collected some of the materials, the Author's thanks are also due.

KANNY LALL DEY.

Calcutta, 4, Beadon Street,
1st July, 1896.

INDIAN PHARMACOLOGY—A REVIEW.

PRESIDENTIAL ADDRESS DELIVERED BY THE AUTHOR IN THE SECTION OF PHARMACOLOGY, INDIAN MEDICAL CONGRESS, DECEMBER 1894.

THE immortal Darwin concluded one of his most exhaustive monographs with the words:—"We only see how little has been made out in comparison with what remains unexplained and unknown." This is exactly my feeling to-day in attempting to place before you a brief review of the subject which I have made a study for more than forty years.

I am fully conscious of the responsibility attached to the office to which you have done me the honour to elect me, and I trust that you may not be disappointed in my fulfilment of these responsibilities. I am becoming more and more reconciled to the fact that advancing age constrains me to leave this legacy of work undone to younger and abler men, but I shall endeavour in the time at my disposal to lay before you a sketch of the

PROGRESS OF PHARMACOLOGY

in India, with some suggestions of possibilities as to its future.

It may not be unprofitable to glance for a moment at the ancient Sanskrit Materia Medica of a time long preceding the advent even of Mohamedanism in India,

over seven centuries ago. I have quite lately found great pleasure and no small instruction in a research into the old Sanskrit works dealing with the classification of vegetables and the utilization of their parts in medicine as practised by the physicians of India of the Puranic era some thirteen centuries ago. The elaborate directions for the collection of drugs and their subsequent manipulation is, strange as it may seem to European minds at least, not by any means unworthy of the methods of to-day, and you will perhaps be as astonished to learn, as I was to find, that some of the mistakes of the most ancient of these Sanskrit writings survive in some of the best books treating of the indigenous drugs of India at the present time. They show the great progress which the ancient Hindús had made in the healing art. Minute instructions were given on every conceivable point, such as the gathering of herbs, preparation of medicines, and the like. Annual plants were to be collected before the ripening of the seed, biennials in the spring, and perennials in the autumn: twigs were to be of the present year's growth: the roots to be collected in the cold season: the leaves in the hot season: and the barks and woods in the rains. There were no fewer than twenty-six forms of medicine, including powders, extracts and boluses, decoctions and infusions in water and milk, syrups, expressions, distillations, fermentations, and medicated oils, many of them crude enough in their exhibition but wondrously efficacious in the respective ailments for which they were designed. Not, however, until the quickening influence of British supremacy had been fully established in India was any notable attempt made, of which there is any record, to improve or to augment what was already known of the medicinal resources of this country. Sir William Jones' "Botanical Observations on Select Indian Plants," was one

of the earliest contributions in this direction: John Fleming's "Catalogue of Medicinal Plants" (1810); Ainslie's "Materia Medica of Hindustan" (1813 and 1826); Roxburgh's "Flora Indica" in 1820, and the labours of Wallich, Royle, and later, of Drs. F. J. Mouat and F. N. Macnamara and other ardent botanists did much towards resolving the chaos in which they found the vast mass of material at their disposal into some degree of scientific arrangement.

The gradual progress of Indian pharmacology, the widening and deepening of its influence, and its possibilities in contributing to the health and consequent prosperity of this vast Empire have been in complete sympathy with the gradual development of commerce, medicine, and science in this country. Clear of the mythology and superstition from which, not unlike the medical science of Europe, it evolved, but which lingers still in India, the science has in some measure at least demonstrated the marvellously liberal provision of curative and remedial agents within the reach of the teeming millions of this Empire. Following O'Shaugnessy's *Bengal Pharmacopœia* (1844), the publication of the

PHARMACOPŒIA OF INDIA

(1868) under the Editorship of Dr. Waring, signalized a new epoch in the establishing of the value of indigenous medicinal products. The more important were stamped with some measure of official recognition, a preliminary step to the ultimate adoption of several in the *British Pharmacopœia*, a distinction of which many more, as I shall hope to show, are equally worthy. Dr. Mohideen Sheriff's "Supplement to the Pharmacopœia," published in the following year, added very materially to the usefulness of that work, while his posthumous work, edited by Mr. David Hooper, "Materia Medica of Madras," is a useful work of reference relating to the drugs

of that Presidency. Dr. U. C. Dutt's translation of "Sanskrit Materia Medica" enriched this department of medical science in no inconsiderable degree. The painstaking labours of Flückiger and Hanbury, as embodied in the *Pharmacographia*, were of incalculable value in recording some most important material relating to the medicinal products indigenous to British India. Among recent authors the work of the late lamented Dymock has been perhaps the most valuable. His "Materia Medica of Western India" (1883) was a most careful compilation, while his later work, *Pharmacographia Indica*, in joint authorship with Warden and Hooper, is an admirable emulation of its perfect prototype.

The comprehensive "Dictionary of the Economic Products of India" by my honourable colleague in the Presidency of this section of the Indian Medical Congress, Dr. George Watt, C.I.E., combines a condensation of all the literature of the subject with all the information it has been possible to secure through official and other sources. Mr. T. N. Mukharji, F.L.S., of the Imperial Museum, Calcutta, has, by the genuineness of his work in this department of science and his painstaking attention to details, come to be recognised as an authority on all matters relating to the indigenous drugs of India. The science is also indebted to Mr. Thomas Christy, F.L.S., London, for his unremitted exertion to discover the value of new drugs and to introduce them to the commercial world.

International Exhibitions

in different parts of the world, and the invitations to the Indian Government to prepare exhibits infused fresh impetus into the somewhat commonplace researches into the medicinal resources of this country.

Thus attempts have been made to separate the wheat from the tares. The literature on the subject is voluminous,

tending even in the best and most recent works towards reprint and repetition, and the repetition, as I have already pointed out, of statements that should long ago have been relegated to the oblivion whence they originated. In a new edition of my own little work (published originally in 1867), on the "Indigenous Drugs of India," the advance sheets of which I have the honour to lay before you, I have tried to remedy these defects as far as possible, to remove the errors and mistakes into which writer after writer had fallen by copying and quoting one after another, to "prove all and hold fast the good."

If we look now for

RESULTS

we will find that *Materia Medica* as a science has benefited materially from these researches, that the *armamenta* of the unprejudiced physician has been increased with advantage, helping to raise Indian medicine in some small measure at least out of the mire of empiricism. The medicinal properties and uses of these munificent gifts of Nature have become better known among the people, and uses that before were confined to districts have spread to larger and more useful areas. But while the example of the Government of India is to be taken as our criterion in many instances it is not so in this particular case. It is surely a reproach that in the latest list of medical stores for hospitals in Bengal only one country medicine—the herb chiretta—appears.*

* The Government of India have since supplemented this information by their Resolution under date, Simla, 31st October 1895, appointing a Commission to consider the desirability of extending the use of indigenous drugs in India, of which the following is an excerpt :—

"The Government of India are advised that the more extended use of indigenous drugs in pharmacological preparations has hitherto been

It is in view of such considerations as these that I would endeavour to offer some practical suggestions as to how the more important of our indigenous drugs may be dealt with, not merely as indifferent substitutes for European products but as each filling a place of its own in point of usefulness and therapeutic value. The first consideration is that of

IDENTIFICATION.

This will remain a prime difficulty until certain prominent characteristics of each drug become established, as no amount of verbal description will enable the non-botanical mind to identify some plants and parts which even in themselves do not invariably present quite the same characters. The ease and cheapness with which almost all the drugs of this country are to be obtained will be facilitated greatly

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retarded by the circumstance that the sophistication and adulteration of these drugs are carried on so systematically that it is almost impossible to procure them locally in a pure state, and also because there are now available imported remedies of a much more efficient nature. Certain indigenous drugs, which can be obtained pure in the local market, and in which adulterations can be detected, are used at the Medical Depôts. In his paper on the subject, Rai Bahadur Kanny Lall Dey concludes, from a perusal of the latest list of medical stores for hospitals in Bengal that only one such drug, namely, chiretta, is so utilized but from the list marginally noted of drugs now used in the Medical Depôts, which has been furnished to the Government of India, it would seem that his information upon this point was imperfect. The Government of India have no doubt that other indigenous drugs would be employed in the Medical Depôts if they could be obtained pure, of a stable character, and at a price not exceeding that at which they can be imported."

List of drugs purchased locally at the Calcutta depôt.

Asafœtida.	Glycyrrhiza root
Calumba root.	Gum arabic.
Cardamom seeds.	Kino.
Catechu.	Myrrh.
Cinnamon bark.	Nux-vomica.
Chiretta.	Senna leaves.
Cubebs.	Anise oil.
Ginger.	Cinnamon oil.
Galls.	Santal oil.

Castor oil.

[Indian opium and Indian grown cinchona and their alkaloids are also used exclusively.]

with the help of the vernacular names peculiar to each district, as also with the aid of the professional castes who deal in these substances, the *Musheras* of Central and Upper India, the low caste *Maules, Bediyás, Bagdis, Kaibartas, Pods, Chandals, Kaoras,* and *Karangas* of Bengal and the *Chandras, Bhils,* and *Gamtas* of Bombay. These humble communities of the several Presidencies of India can render immense service to medical men in supplying medicinal plants. This fact was fully recognised by Sir William Jones, the President-founder of the Asiatic Society of Bengal. In the second volume of his "Botanical Observations on Select Indian Plants" he wrote:—

"I am very solicitous to give Indian plants their true Indian appellations; because I am fully persuaded that Linnæus himself would have adopted them, had he known the learned and ancient language of this country. * * * Far am I from doubting the great importance of perfect botanical descriptions, for languages expire as nations decay, and the true sense of many appellatives in every dead language must be lost in the course of ages; but as long as those appellatives remain understood, a travelling physician who should wish to procure an Arabian or Indian plant, and without asking for it by its learned or vulgar name, should hunt for it in the woods by its botanical character, would resemble a geographer, who, desiring to enquire by name for a street or a town, would wait with his tables and instruments for a proper occasion to determine its longitude and latitude."

The suggestion herein conveyed has been carried into effect in such names as *Anthocephalus Cadamba* and *Cedrus Deodara,* but it is to be regretted that it has not been possible to widen the system in the nomenclature of plants peculiar to India.

Botanically, many of the doubtful points relating to the plants yielding these drugs have been set at rest for ever in Sir Joseph Hooker's extensive work, the "Flora of British

India," now completed in all but the grasses, while the index collections of authentic specimens which are in process of formation at the Imperial Museum, Calcutta, and the Imperial Institute, London, to which the "Dictionary of Economic Products" is to form the catalogue and key, will, when complete, facilitate the identification of these products for commercial purposes. All the well-oiled machinery of this official mill, however, will not bring our acquaintance with those of our Native medicines that we ought to know better out of the theoretical into the practical. I would suggest a further step in the establishment of facilities for the supply of

RELIABLE PREPARATIONS,

ready for immediate use by physicians. It is vain to expect medical officers to assume the *rôle* either of botanists or druggists. That is a condition of things which has long gone by. I have to suggest, therefore, that the Medical Storekeepers of the respective Presidencies should be asked to make some definite pharmaceutical preparations at their respective laboratories for distribution to the various hospitals and dispensaries for trial and report. In this way a step would be made towards their practical utilization while the advisability or otherwise of their replacing costly imported drugs could be most readily determined. Absolute dependence ought not to be placed on individual opinion, for such may be formed from preconceived notions or may be affected by influences or considerations which may detract from their real value. Some such arrangement once thoroughly established, however, the great Indian Medical Service will be a source of unlimited blessing to the people and will be independent of the *-ines* and the *-anes* and the synthetical monstrosities innumerable of these last days. The particular class of preparation I would favour is the

general one of fluid extracts as originated in the *United States Pharmacopœia*, one part of the product representing one part of the original drug operated upon.* They present the advantages of portability, permanence and adaptability, with concentration and uniformity. I have myself made several experiments in this direction, the results of which I have the honour to present for your inspection. I am persuaded that the future of Indian pharmacology depends largely on considerations such as I have indicated to you.

The next important point is the commercial aspect of this question. The Government of India has encouraged with a liberality beyond all precedence the cultivation of medicinal plants suited to India, and the experimental cultivation of others which have proved to be unsuitable to the soil. The result has been, on the one hand, that the cinchona industry of the world has been completely revolutionised, ruined, some will say, while on the other, thousands of rupees have been spent to practically no purpose in the attempt to establish ipecacuanha. The time has now come for laying out

MEDICINAL PLANT FARMS

in the districts most suited to the drugs which it is proposed to grow. There is enough belladonna on the Himálaya to supply the world, which, if transplanted and carefully cultivated, would surely at least save India the necessity, if not the cost, of importing that among many other drugs which might similarly be grown. The medicinal plant and essential oil gardens of Germany and Belgium are sufficient evidence of the success attending such enterprise. Another most desirable step which would follow this in natural sequence would be the establishment of a

* See Appendix III, FLUID EXTRACTS, page 341.

drug emporium for India. This for obvious reasons would be most practically effected at Calcutta. A class of drug brokers would arise, whose business it would be to encourage the systematic collection of drugs for export to the great markets of Europe, Australia and America. The sorting of the drugs into their various qualities could be effected quite as easily in the Calcutta as in the London market, and the present anomalous position of the Indian druggists importing drugs which have already been shipped from India would be done away. There are thousands of tons of valuable roots and flowers, and fruits and fibres rotting in the jungles every year for want of a proper market in which to have their approximate values appraised. Nor are they even on the Himálaya so very inaccessible. The gentian grubbers of the Alps spend weeks at a time far away from their homes collecting for the market. Some of the medicinal plant farmers about Brussels employ 500 collectors—whole families—who go out into the surrounding districts and collect the drugs, which they prepare for the markets of the world. With the cost of labour at a minimum in India and material in profusion, success in some corresponding degree is assured. The ever-improving railway communication should afford a great impetus to such an industry, which I am confident would in time become one of considerable importance to the people of India.*

Above all I would appeal to my countrymen to be honest. It is unfortunately too true that the art of sophistication and

ADULTERATION

as applied to almost every commodity produced in India,

* See a description of Aconite collection in the Himálaya, Appendix II, page 337.

has served to weaken the faith even of our own countrymen in what we are accustomed to call 'country' products. There are certain branches of industry, it must be admitted, where this process of sophistication provides quite an industry of no little importance, but I ask you—is this sufficient compensation for a diminished faith and consequent depreciation in value in our exports to European markets? I do not say that we are even approaching in ingenuity to that which created the wooden nutmeg, but I hold that the success of all that I anticipate for the indigenous drugs of India depends upon this consideration. If I may present one or two instances in the brief space now at my disposal, I would remind you that *Cannabis indica* has lost a very considerable portion of the reputation it once had in European practice on account of the fact that it is not of the same standard of quality as it was in former years. Similarly, the bark of *Holarrhena antidysenterica*, the *kurchí*, is losing its undoubted position as a specific in dysentery through the substitution of worthless barks. The aconites are equally unreliable, due, however, to careless collection rather than adulteration.

Among the most important of the drugs exported at present are :—Nux-vomica, sandal-wood, Indian aconite (*Aconitum ferox*), Indian opium, Indian hemp, cinchona, chiretta, castor and croton-oil seeds, linseed, sesamé and ground-nut oils, kino, ginger, capsicum, senna and catechu, while among others which might be exported to a larger extent than at present are :—Belladonna, hyoscyamus, taraxacum, podophyllum, jalap (*Ipomœa Turpethum*), asafœtida, cassia pods, cardamoms, kurchí, gurjun, chaulmúgra and ním oils, ispaghúl.

I am hopeful that considerable encouragement will be afforded to the better appreciation of our indigenous drugs

by the fact that some are likely to be included in the proposed

Imperial Pharmacopœia.

In a paper which I prepared for the International Pharmaceutical Congress held in London in 1881, and which was presented on my behalf, I suggested several drugs as worthy of inclusion in a proposed revision of the *British Pharmacopœia*. These suggestions are embodied in the following list :—

Botanical Source.	Popular Name.	Properties.
Adhatoda Vasica ...	*Bákash* ...	Expectorant.
Andrographis paniculata ...	*Creat* ...	Febrifuge.
Calotropis gigantea ...	*Mádar* ...	Alterative & Antipyretic.
Carica Papaya ...	*Papaya* ...	Source of Papaïn.
Dipterocarpus turbinatus ...	*Gurjun* ...	Analogous to Copaiba.
Garcinia mangostana ...	*Mangosteen* ...	Astringent.
Gynocardia odorata ...	*Chaulmúgra* ...	Useful in Leprosy.
Holarrhena antidysenterica	*Kurchí* ...	Specific in Dysentery.
Melia Azadirachta ...	*Nim* ...	Bitter Tonic and Anti-periodic.
Psoralea corylifolia ...	*Bábchí* ...	Useful in Leucoderma.
Symplocos racemosa ...	*Lodhra* ...	Useful in Menorrhágia.

I have now attempted to place before you some of my views and some of my expectations which, in my old age, I cannot hope to see realised, but which, in the best interests of the great Oriental Empire of Her Majesty, I venture to hope may be furthered in some measure by this Indian Medical Congress.

BRITISH INDIAN WEIGHTS AND MEASURES AND EQUIVALENTS.

Measures of Weight (Bengal.)

Unit of Weight—the *tola**=180 grains English Troy or Apothecaries' Weight.

1 Dhán (or grain)	=	$\frac{15}{32}$ grain Troy	=	$\frac{9}{175}$ dr. Avoir.	
4 Dháns = 1 Rati†	=	$1\frac{4}{8}$,, ,,	=	$\frac{14}{175}$,,	
8 Ratis = 1 Masha	=	15 grains ,,	=	$\frac{86}{175}$,,	
12 Mashas = 1 Tola	=	180 grains (7 dwt. 12 grains) ,,	=	$6\frac{92}{175}$,,	
5 Tolas = 1 Chittack	=	1 oz. $17\frac{1}{2}$ dwt. ,,	=	$2\frac{7}{35}$ oz. ,,	
16 Chittacks = 1 Seer	=	$2\frac{1}{4}$ lbs. ,,	=	$2\frac{7}{35}$ lbs. ,,	
40 Seers = 1 Maund	=	100 ,, ,,	=	$82\frac{2}{7}$,, ,,	

To Convert Indian Weights into Avoirdupois.

Multiply the weight in maunds by 5 and divide by 7; the result will be the weight in cwt. Avoirdupois.

To Convert Avoirdupois Weight into Indian Weight.

Multiply the weight in maunds by 7 and divide by 5; the result will be the weight in Maunds.

The Bombay Maund weighs 28 lbs. Avoirdupois.
The Surat ,, ,, $37\frac{1}{2}$ lbs. ,,

A Ton is equal to 27·2 Maunds, or $27\frac{1}{4}$ Maunds nearly.
Liquids are usually reckoned by weight.

Bengal Square or Land Measure.

1 chittak	=	45 sq. ft. or	5 sq. yds.
16 chittaks = 1 cottah	=	720 ,, or	80 ,,
20 cottahs = 1 bigah	=	14,400 ,, or	1,600 ,,
$3\frac{1}{3}$ bigahs	=	1 acre.	

British Indian Money.

1 Pie ...			marked P.	par value	=	$\frac{1}{2}$ Farthing.
3 Pies ...	=	1 Pice ... ,,	Ps.	,,	=	$1\frac{1}{2}$,,
8 Pies ...					=	1 Penny.
4 Pice or 12 Pies	=	1 Anna ... ,,	A.	,,	=	$1\frac{1}{2}$ Pence.
16 Annas ...	=	1 Rupee ... ,,	R.	,,	=	2 Shillings,‡ (nominal) value.
16 Rupees ...	=	1 Gold Mohur ,,	G. M.			

Cowries (*Cypræa moneta*), or small shells, are also made use of for fractional payments.

They are reckoned in Bengal :—

4 Cowries	make 1 Gunda.
20 Gundas	,, 1 Pun.
5 Puns (400 cowries) ...	,, 1 Anna.

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* A new rupee of the present currency weighs 1 tola.
† Commonly, seeds of *Abrus precatorius*.
‡ The Exchange value of a Rupee of 1st July, 1896, stood at 1*s*. 2*d*.

CORRIGENDA.

Page	11,	line	10	from bottom,	*for*	Æchenanthera	*read*	Adenanthera.
,,	38	,,	9	,,	,,	Narthex	,,	alliacea.
,,	39	,,	13	,, top	*omit*	Aspidium Filix-mas.		
,,	69	,,	3	,,	*for*	Lgiusticum	*read*	Ligusticum.
,,	73	,,	1 & 2	,,	,,	Sophora	,,	Sophera.
,,	118	,,	10	,,	,,	Burmanii	,,	Burmanni.
,,	221	,,	15	,, bottom			,,	2-lbs.
,,	244	,,	6	,, top			,,	full.
,,	268	,,	16	,, top	,,	4,000	,,	700.
,,	273	Foot-note †,			,,	Her	,,	Herr.
,,	283	line	6	from bottom	,,	chanand	,,	chandan.
,,	289	,,	5	,, top	,,	hyacinthina	,,	hyacinthoides.
,,	303	Foot-note,			,,	Matindale	,,	Martindale.
,,	323	line	12	from top			,,	magnesium.
,,	343	,,	2	,, bottom			,,	having 30.
,,	345	,,	7	of centre column			,,	Water 1.

CONTRACTIONS OF VERNACULAR DESIGNATIONS.

Beng.—Bengali.
Hind.—Hindi.
Sans.—Sanskrit.
Bom.—Bombay (including Guzrathi and Mahrathi).
Tam.—Tamil.
Tel.—Telugu.
Burm.—Burmese.
Mal.—Malayalim (including Cochin and Travancore).
Pers.—Persian.
Arab.—Arabic.

INDIGENOUS DRUGS

OF INDIA.

ABIES WEBBIANA.

Syn.—Pinus Webbiana.

The Himaláyan Silver Fir.

Vern.—*Beng.*—Tálispatra; *Hind.*—Tálispatra; *Sans.*—Tálísapatra.

This lofty fir, natural order *Coniferæ*, is widely distributed on the higher ranges of the Himálayas. It yields a very pure white resin.

Medicinal uses.—The dried terebinthinous Leaves are useful in coughs, phthisis, &c. The leaves of *Taxus baccata* are frequently substituted in the bazars of Calcutta and Bombay. It is doubtful whether *Abies Webbiana* is the *tálispatra*.

ABROMA AUGUSTA.

Perennial Indian Hemp.

Vern.—*Beng.*—Ulatkambal.

An Indian plant, of the natural order *Malvaceæ*, which is likely to come into prominent notice owing to its medicinal and fibre-yielding qualities.

Medicinal uses.—The ROOT-BARK is emmenagogue, valuable in dysmenorrhœa. It may be administered in doses of one drachm. A decoction of the dried root is equally efficacious. The natives use it in combination with black pepper.

ABRUS PRECATORIUS.

JEQUIRITY.

Vern.—*Beng.*—Kunch ; *Hind.*—Ghunchi ; *Sans.*—Gunjá. *Guz.*—Gumchi ; *Tam.*—Gundumanni ; *Telu.*—Guriginja ; *Pers.*—Gungchi.

A beautiful climbing plant, of the natural order *Leguminosæ*, found all over India. The ROOT of *Abrus precatorius* was formerly regarded as a substitute for liquorice and commonly called Indian Liquorice. The LEAVES have been shown recently by Hooper to contain a large proportion of glycyrrhizic acid. The curiously coloured SEEDS are used as weights (*rati*)—average weight 2 grains—by Indian goldsmiths and are strung together for ornaments.

Medicinal uses.—The watery extract of the ROOT is useful in relieving obstinate cough. It can be used like liquorice as an adjuvant in mixtures. The SEEDS are poisonous and are used internally in nervous affections, but their use is attended with extreme danger.

A 3 per cent. solution of the decorticated seeds—prepared by macerating in water for 24 hours—has lately been used to produce purulent ophthalmia. The active principle has been isolated and named *abrin*. The intensely virulent nature of the seeds has been employed in the criminal poisoning of cattle in India.

ACACIA ARABICA.

THE INDIAN GUM ARABIC TREE.

Vern.—*Beng.*—Báblá; *Hind.*—Babul, kikár; *Sans.*—Vabbula; *Guz.*—Kaloabaval; *Tam.*—Karmelam; *Telu.*—Nallu-tuma; *Pers.*—Babul.

The Báblá tree, of the natural order *Leguminosæ*, is common all over India, plentiful in Bengal, the Deccan and Coromandel Coast, and yields a gum, somewhat darker in colour but not much inferior in adhesive property to that of *Acacia vera*. The bark is extensively used for tanning purposes.

Medicinal uses.—The BARK is a powerful astringent, containing a large quantity of tannin, and its decoction is largely used as a substitute for oak bark with great success and efficacy. The decoction is used as an astringent, gargle and wash, and in cases where a vegetable astringent is indicated.

Externally used as an injection in leucorrhœa and vaginal discharges, and for astringent enemata generally.

It has been used in conjunction with the bark of the *Banyan tree* (*Ficus bengalensis*).

ACACIA CATECHU.

CATECHU: CUTCH: TERRA JAPONICA.

Vern.—*Beng.*—Khair; *Hind.*—Kath; *Sans.*—Khadira; *Tam.*—Kashu-katti; *Telu.*—Kanchu.

An EXTRACT prepared in India and Burma from the wood of *Acacia Catechu*, of the natural order *Leguminosæ*. The tree is common in the forests of many parts of India and Burma. It is an ingredient of the packet of betel

leaves, or *pán*, chewed by the Indian people. The tree yields an excellent gum which might be made a profitable article of export. Crystals of a peculiar crystalline substance named *Khersal* are sometimes found in the interior of the stem like the camphor of *Dryobalanops camphora*.

Medicinal uses.—Astringent and tonic. In diarrhœa catechu is of much value administered either in powder form or as tincture combined with other astringents and opium. In mercurial salivation, and in ulceration and sponginess of the gums it is of great service. It is equally useful in hoarseness, relaxed sore throat, loss of voice, &c., used in the form of a lozenge.

The tincture is an excellent application for threatened bed sores.

ACACIA FARNESIANA.

Syn.—Mimosa Farnesiana.

The Cassie Flower.

Vern.—*Beng.*—Gúya bábla; *Hind.*—Vilayati bábúl; *Guz.*—Gu-baval; *Tam.*—Vedda-vela; *Telu.*—Nuga Tumma.

This graceful little plant, natural order *Leguminosæ*, grows all over India and is well known by its bright yellow Flowers which yield a most delicious perfume. The cassie is not to be confused with the cassia or cinnamon. The fragrant flowers are largely used in perfumery. It is so easily grown in India that the flowers ought to form an important article of cultivation and export. A Gum exudes from the bark of the tree which is a good substitute for gum arabic, but yields a gelatinous fluid on treatment with water.

ACALYPHA INDICA.

Vern.—*Beng.*—Muktajhuri, Muktabarshi, *Hind.*—Rupi; *Tam.*—Kuppin-memi; *Telu.*—Kuppin-chetta.

The plant *Acalypha indica*, of the natural order *Euphorbiaceæ*, is a common annual in Indian gardens.

Medicinal uses.—The decoction of the LEAVES is a valuable laxative, and the ROOT bruised in water, a cathartic. The expressed juice of the fresh leaves is a reliable emetic, and is used as such to some extent in Hindu medicine: it has been found useful in cases of croup. In cases of constipation of children the bruised leaves introduced after the manner of a suppository has the invariable effect of at once relieving the contraction of the *sphincter ani*.

ACAMPE PAPILLOSA.

Vern.—Beng; *Hind.*—Rasná; *Sans.*—Gandha-nakuli.

An orchid found in many parts of India, but common in Konkan, South India and Burma. The roots of this as well as of some other orchids, such as *Vanda Roxburghii* and *V. Wightiana* are known among Indian practitioners by the name *of Rasná*.

Medicinal uses.—The ROOT, given in the form of a decoction, is said to be highly efficacious in acute rheumatism, sciatica and neuralgia. It is also considered beneficial in secondary syphilis and uterine diseases.

ACETUM.

COUNTRY VINEGAR.

Vern.—*Beng.*—Sirka; *Hind.*—Sirko; *Guz.*—Sirka; *Tam.*—Kadi; *Telu.*—Kadi nillu; *Pers.*—Sirkah.

Vinegar is made all over India either from the sugar-cane or from toddy which has been made from native spirit.

The fresh juice of the *Cocos nucifera* and that of *Borassus flabelliformus* and *Phœnix sylvestris* are also capable of the acetous fermentation while the *Mahuá* flowers (*Bassia latifolia*) also yield on infusion in water a saccharine liquor which yields a good vinegar.

ACHILLEA MILLEFOLIUM.

MILFOIL OR YARROW.

Vern.—*Bom.*—Rojmari.

A common herb, natural order *Compositæ*, indigenous to the Western Himálaya, found plentifully on the hills a little to the north of Simla. The plant yields a bitter, aromatic volatile oil of characteristic odour. It is seldom used in India.

Medicinal uses.—The LEAVES and FLOWER HEADS are used in the form of decoction as a carminative, tonic and aromatic stimulant.

ACHYRANTHES ASPERA.

Vern.—*Beng.*—Apáng; *Hind.*—Chirchira; *Sans.*—Apamárga. *Guz.*—Jhinjarvatto; *Telu.*—Utta-reni; *Pers.*—Khare vazhun.

A small plant, of the natural order *Amarantaceæ*, very common in all parts of India and highly extolled by the people as a remedy for bites of poisonous insects.

Medicinal use.—Diuretic. Acts very mildly on the kidneys and tends to increase their secretions. Has been occasionally found efficacious in renal dropsies.

ACONITUM FEROX.

INDIAN ACONITE.

Vern.—*Beng.*—Kátbîsh or mitha; *Hind.*—Bîsh; *Sans.*—Visha; *Guz.*—Vuchnag; *Tam.*—Vishna nuir; *Telu.*—Vasa-nubhi; *Pers.*—Bishnag; *Arab.*—Bish.

The poisonous root *Bish* of the bazaars is chiefly derived from *Aconitum ferox*, natural order *Ranunculaceæ*, which grows plentifully in the temperate and sub-alpine regions of the Himálaya. It must be regarded as distinctly more powerful than that of *Aconitum Napellus*, and hence more suited for the preparation of external applications or the manufacture of *aconitine*. As sold in the bazars it is of very variable nature.

Medicinal uses.—The ROOT yields a comparatively larger quantity of *pseudaconitine* or *nepaline* and a smaller quantity of *aconitine* than other species of aconite, the former being the more powerful, physiologically, of the two alkaloids. It is therefore not to be given in the same doses as the true aconite. In the form of liniment it is useful in cases of neuralgia and muscular rheumatism. It is used by the *hakims* in very small doses as an antiperiodic and alterative and as a nervine tonic in cases of paralysis, but considerable danger attends its internal administration on account of the extremely virulent character of the drug.

ACONITUM HETEROPHYLLUM.

INDIAN ATEES.

Vern.—*Beng.*—Atís; *Hind.*—Atís; *Sans.*—Ataicha; *Tam.*—Ati-vudayam; *Telu.*—Ativasu; *Pers.*—Vuggi-turki.

The tuberous roots of this plant are considered tonic, astringent, stomachic and aphrodisiac. The drug is chiefly

used in the form of powder which is pure white, farinaceous, and with an intensely bitter taste.

The active principle is *atisine*, an amorphous alkaloid of intensely bitter taste but non-poisonous. *Aconitine* is absent in the true *Atis*.

Medicinal uses.—Used as an antiperiodic in fevers. Eminent authorities have considered it a valuable febrifuge and bitter tonic in the absence of quinine. For combating the debility after fevers and other diseases it is an excellent tonic, very efficacious in diarrhœa and dysentery.

Substitute.—The dried tubers of *Asparagus sarmentosus* (*Satamulî*), slightly resembling that of *Aconitum heterophyllum*, are sometimes sold in the bazars of Bengal under the name of *Atís*. This is insipid and perfectly inert.

ACONITUM NAPELLUS.

MONKSHOOD.

Vern.—*Beng.*—Kátbîsh ; *Hind.*—Mithazahar ; *Sans.*—Visha.

Indigenous to the temperate Himálayan region where it grows in abundance. The dried root is extensively used in Indian medicine, and, but for the fact that it is very frequently found mixed with the roots of other species of aconite, might be used with the same confidence as the imported drug. It yields several chemical principles which are interesting on account of their peculiarly virulent action on the animal economy, the principal of these being the alkaloid *aconitine*. The true aconite is not easily obtainable in the bazars.

Medicinal uses.—These have already been indicated under *Aconitum ferox*. Most of the preparations are made

from the ROOT, but an extract is made from the fresh LEAVES and flowering tops. This, however, is somewhat variable in its composition.

ACORUS CALAMUS.

SWEET FLAG.

Vern.—*Beng.*—Bach; *Hind.*—Bash; *Sans.*—Vachá; *Guz.*—Vach; *Tam.*—Vashambu; *Telu.*—Vadaja; *Pers.*—Agri-turki.

The DRIED RHIZOME of this plant is one of the commonest of bazar medicines and is indigenous to India and Burma. (Natural order *Aroideæ.*) It has been a favourite medicine with the people of India from the earliest times. It is a tonic and stomachic, and is given in the form of infusion. It is bitter, stimulant and aromatic, yielding a glucoside *acorin* and a volatile oil.

Medicinal uses.—Used in dyspepsia attended with flatulence, in loss of appetite and constitutional debility. In cases of irritation of the throat and cough, the ROOT, simply chewed, produces copious salivation and an agreeable sensation of warmth. It has been used with beneficial effect in diarrhœa of children. It is also carminative and nervine in small doses and emetic in large doses.

ACTÆA SPICATA.

BANEBERRY.

This is indigenous to the temperate Himálayan region and is closely allied to the *Actæa racemosa* or Black Snake Root of American *eclectic* medicine. Natural order *Ranunculaceæ. Cimicifuga fœtida* is another Himálayan plant which is similarly allied to the official plant.

Medicinal uses.—Usually prescribed in the form of a tincture of the ROOT. It acts as a powerful nerve sedative in neuralgia, rheumatic affections and the like.

ADANSONIA DIGITATA.

THE BAOBAB TREE.

Vern.—*Hind.*—Gorakh amali ; *Tam.*—Anai-puliyaroy.

The Baobab is said to be one of the longest-lived trees in the world. It grows to a great height, and has been known to attain 30 feet in diameter. Found chiefly on the Bombay Coast. Natural order *Malvaceæ.*

The BARK yields a GUM which is insoluble in water and would seem to be allied to tragacanth. There has been also isolated from the bark a principle named *Adansonia.*

Medicinal use.—The BARK has been used as an anti-periodic.

ADHATODA VASICA.

Vern.—*Beng.*—Bákash ; *Hind.*—Arushá ; *Sans.*—Vásaka ; *Tam.*—Adatodai ; *Telu.*—Addasaram ; *Pers.*—Bansa.

The plant *Adhatoda Vasica,* of the natural order *Acanthaceæ,* grows wild all over Bengal. All the parts of this plant are bitterish and slightly aromatic and supposed to be antispasmodic. The ROOTS are expectorant and used as a substitute for senega.

An infusion of the plant has lately been used as a remedy against blight on tea and other crops, and it has been suggested quite recently by Dr. Watt that it may be found useful as an antiseptic to destroy the germs of disease in drinking water.

Medicinal uses.—The ROOT, BARK and LEAVES are useful in cough, asthma, ague and phthisis. In catarrh and bronchitis the remedy is in frequent use in native practice, usually in the form of infusion of the root and extract of the leaves. The dried LEAVES are also smoked in cases of asthma.

ADIANTUM.

Vern.—*Hind.*—Hansraj; *Arab.*—Shaur-ul-jinn.

The Maiden-hair Fern (*A. Capillus-Veneris*) and several other species of *Adiantum* (tribe *Pterideæ*) are indigenous to India and widely distributed. The graceful delicate fronds are well known, and in the dried state are sold largely in the Punjab bazars.

Medicinal uses.—The FRONDS possess bitter and expectorant properties; emetic in large doses. They are best employed in the form of a syrup which corresponds to the *Sirop de Capillaire* of the French Codex, and which is so extensively used in Europe for chest affections.

ÆCHENANTHERA PAVONINA.

Vern.—*Beng.*—Rakta-kambal; *Tam.*—Anai-gundumani; *Telu.*—Bandi-gurivenda.

A large tree, of the natural order *Leguminosæ*, common in Bengal, South India and Burma.

Medicinal uses.—The SEEDS, which like those of *Abrus precatorius* are of a brilliant red colour, are said to be efficacious as an external application on boils, abscesses and all kinds of inflammation. The decoction of the LEAVES is prescribed for chronic rhematism and gout.

ÆGLE MARMELOS.

THE BAEL FRUIT TREE: BENGAL QUINCE.

Vern.—*Beng.*—Bél; *Hind.*—Bél; *Sans.*—Bilva, Sriphal; *Guz.*—Biliva-phal; *Tam.*—Vilva-pazham; *Telu.*—Bilvapandu; *Pers.*—Shul.

The *Ægle Marmelos*, of the natural order *Rutaceæ*, is indigenous to and cultivated all over India. The tree is held in great veneration by the Hindus. It is sacred to Siva whose worship cannot be accomplished without it. Its leaves are ternate and hence one of its vernacular names is the *Tripatra*. As a medicinal agent it has perhaps been longer known and appreciated by the Indian people than any other. The unripe or half-ripe FRUIT is regarded as astringent, digestive and stomachic, and useful in restraining discharges from the alimentary canal. The ripe fruit is sweet, aromatic and laxative. Two kinds may be found in the bazars—the small or wild variety and the larger or cultivated fruit. The officinal portion is the full grown FRUIT of either variety, just when it *begins* to ripen.

It does not lose its astringent property on drying or keeping, although the fresh fruit is the most reliable. This medicinal property is not due to tannin, of which it only contains a small quantity, but partly to the pectin and mucilaginous principles contained in the jelly-like mucous surrounding the seeds and to the astringent acids of the unripe fruit.

Medicinal uses.—The remarkable efficacy of the Bael in chronic dysentery and diarrhœa is well known. The dried FRUIT and liquid extract are official in the *British Pharmacopœia* and an extract and liquid extract are official in the *Pharmacopœia of India*. These preparations are extremely popular with medical practitioners in England.

It is valuable in obstinate cases of diarrhœa and dysentery when unattended by fever, and the patient is weak and dyspeptic. It is also very valuable in diarrhœa and dysentery of children.

It may also be administered in powder or as a dietetic in the form of an aromatised confection. The fresh juice of the LEAVES is largely used in Bengal as antibilious and febrifuge. The unripe fruit is roasted and eaten with sugar in chronic dysentery and diarrhœa. A decoction of this dried bael—*Bel suti*—is in frequent use among the natives as a drink for the sick, especially for cases of fever with diarrhœa. The natives also make from the ripe fruit a delicious and refrigerent sherbet which they use largely. An essence prepared from the entire half-ripe fruit has been found by the author to be the most reliable preparation.

ÆSCHYNOMENE ASPERA.

THE SOLA PLANT.

Vern.—*Beng.*—Solá, Phul-solá ; *Mar.*—Bland ; *Tam.*—Takke ; *Telu.*—Bend.

A small sub-floating bush, natural order *Leguminosæ*, found in the marshes of Bengal, South India and Assam. The spongy stems of the plant are largely used in the manufacture of hats for European use, forming a good protection against the tropical sun.

Medicinal use.—The spongy pith is sometimes used as a substitute for surgical lint, specially for dilating the openings of sinuses and abscesses. The pith absorbs the moisture of the ulcerated tissues around, swells up, and thus enlarges the openings.

ÆSCHYNOMENE SESBAN.

See SESBANIA ÆGYPTIANA.

AGARICUS CAMPESTRIS.

THE MUSHROOM.

Vern.—*Beng.*—Konrok, Chhátá ; *Panj*:—Moksha, Gari-kun.

The Mushroom is not cultivated in India for food, but several species of the fungi are occasionally, specially at the latter end of the rains, found growing wild in fields and gardens, which are collected and eaten by villagers.

Medicinal uses.—Dried mushrooms are largely used in medicine by the *hakims* of Punjab. Diuretic, purgative and emmenagogue properties are ascribed to it. It is considered efficacious in gravel in the bladder. In affections of the throat it is prescribed as a gargle.

AGAVE AMERICANA.

THE AMERICAN ALOE.

Vern.—*Beng. and Hind.*—Rakas-pat, Ban-áaáras, murga.

This plant, of the natural order *Amaryllideæ*, has been long imported from America and naturalized in India, being cultivated for various economic purposes. It is the source of the intoxicating liquor known as *pulque*, which is manufactured in Mexico in enormous quantities.

Medicinal uses.—Diuretic and alterative. The ROOTS and LEAVES yield a saccharine juice which is believed to possess anti-syphilitic virtues similar to those usually ascribed to Sarsaparilla.

AGRIMONIA EUPATORIUM.

AGRIMONY.

This herb is quite common in India especially in the Himálayan range. It belongs to the natural order *Rosaceæ.*

Medicinal uses.—Agrimony is comparatively little used in India, although it has long been a favourite of European herbalists. It is tonic and astringent.

AILANTHUS EXCELSA.

Vern.—*Beng. and Hind.*—Maharukha; *Sans.*—Mádala.

This tree, natural order *Simarubeæ,* is common in many parts of India. The bark is intensely bitter resembling quassia. It yields an important bitter principle which has been named *Ailantic acid.*

Medicinal uses.—The BARK as well as the LEAVES are in great repute as a tonic especially in debility after child-birth. They also possess febrifuge properties and are useful in dyspeptic complaints.

ALANGIUM LAMARCKII.

Syn.—ALANGIUM DECAPETALUM.

Vern.—*Beng.*—Dhulakura, Bágh-ánchrá; *Hind.*—Akola.

Natural order *Cornaceæ:* common in the jungles of Southern India, and occasionally found in the gardens.

Medicinal uses.—The ROOT-BARK possesses the emetic and nauseant properties of ipecacuanha. It is used by native practitioners in cases of leprosy and syphilitic and other skin diseases, and appears to be valuable in this respect. Is useful in simple continued fever. The root-bark is used in the form of powder.

ALCOHOL.

Vern.—*Beng.*—Mad ; *Hind.*—Sharáb ; *Sans.*—Surá.

Spirits and wines have been largely made in India from very ancient times. Sugar, rice, Mahua, the fruit of *Anthocephalus Cadamba*, and various other substances were used in their manufacture. A spirit, called the *Mrita-sanjibani* or the "reviver of the dead" is a favourite stimulant among Indian physicians. It is fermented with raw sugar and some medicinal herbs and distilled.

ALEURITES MOLUCCANA.

Syn.—A. Triloba.

Indian Walnut.

Vern.—*Beng.*—Jangli Akhrót; *Hind.*—Akhrot; *Sans.*—Askhota.

The nuts of the plant *Aleurites moluccana* (natural order *Euphorbiaceæ*). It is native of the Malay Archipelago. It is also found wild in many parts of South India. The kernels of the nuts have the taste of English walnuts. They yield by expression a large proportion of a very agreeable fixed oil which is a good substitute for rape-oil. The true walnut is the nut of *Juglans regii.*

Medicinal uses.—The Kernels are supposed to possess aphrodisiac properties. A mild aperient action has also been ascribed to the Oil, to some extent resembling that of castor-oil.

ALHAGI MAURORUM.

The Persian Manna Tree.

Vern.—*Beng.*—Juwásá ; *Sans.*—Durlavá ; *Hind.*—Jayasi.

The shrub *Alhagi maurorum* (natural order *Leguminosæ*) is a native of the desert of Egypt, Syria, Mesapotamia,

Persia and India. There exudes from the leaves and branches of this shrub a sweet, saccharine substance called the *Taranjabin*, and which resembles in nearly all respects the manna of *Fraxinus ornus* (the manna ash).

Medicinal uses.—As a gentle laxative specially useful and pleasant for children. The infusion of the spinous plant is used in affections of the chest.

ALLIUM CEPA.

THE ONION.

Vern.—*Beng.*—Piyaj; *Hind.*—Piyaz; *Sans.*—Palandu; *Mar.*—Kandá; *Tam.*—Irulli; *Telu.*—Nirulli.

The common onion (natural order *Liliaceæ)* is largely cultivated all over India as an article of food and condiment.

Medicinal uses.—The onion BULBS contain an acrid volatile oil which possesses stimulant, diuretic and expectorant properties, and are therefore prescribed by Indian physicians in fever, dropsy, and affections of the chest and throat. They are also considered hot and pungent, and are useful in flatulency and dysentery.

ALLIUM SATIVUM.

THE GARLIC.

Vern.—*Beng.*—Rasún; *Hind.*—Lasan; *Sans.*—Lasuna; *Guz.*—Shunam; *Tam.*—Velluli; *Pers.*—Sir.

The garlic, a familiar member of the Liliaceous family, is largely cultivated all over India, and is always easily obtainable in the bazars. It yields on distillation with water an aromatic oil, the chief constituent of which is allyl sulphide and to which is due its characteristic odour.

Medicinal uses.—Garlic is carminative, stomachic, alterative, tonic and useful in affections of the nervous system, flatulence, hysteria, &c. The OIL is used externally in rheumatic affections, and paralysis. A small clove of garlic put in the ear allays the pain of otorrhœa. It is not used to any extent in modern medicine.

ALOCASIA INDICA.

Vern.—*Beng.*—Mánkanda, Mánkachu; *Hind.*—Mánkanda; *Sans.*—Mánaka.

The underground stems of *Alocasia indica*, natural order *Aroideæ*, constitute a valuable and important vegetable of native dietary. The plant thrives best in shade under the eaves of huts or buildings and beside fences.

Medicinal uses.—*Mánkachu* is specially useful in anasarca in which disease it is used in the following manner. Take of the powdered meal of *Alocasia indica* eight tolás, (3 ozs.) powdered rice sixteen tolás, (6 ozs.) water and milk forty-eight tolás (20 ozs.) each, boil them together till the water is evaporated. This preparation—called *Mánmanda*—is given as diet. No other food is allowed in addition to it except milk. The dried flour is an excellent substitute for arrow-root and similar farinaceous substances.

ALOE VERA.

BARBADOES OR INDIAN ALOES.

Vern.—*Beng.*—Ghirtá-kumári, Musabbar; *Hind.* — Kumári, Kunvar; *Sans.*—Ghirta-kumari; *Tam.*—Kariya-potam; *Telu.*—Mushambaram; *Mad.*—Eliyá.

This plant is cultivated in some parts of India. The best quality of aloes is that obtained where the leaves are

allowed to drain naturally. When heat is employed the active principle is partly destroyed. The *Mussabbar* yielded by this species is not inferior to imported Socotrine aloes.

The drug in mass is black, it has a glassy fracture. The powder is dull yellow and exhales an aloetic odour. The active principle is *Aloin*.

Medicinal uses.—In small doses it is a stomachic tonic, in large doses purgative, and indirectly, emmenagogue. It is valuable in constipation connected with hysteria or in that dependent on atony of the intestinal muscular tissue and chlorosis.

ALOE VERA.

VAR.—OFFICINALIS.

Syn.—ALOE INDICA.

Vern.—*Beng.*—Ghirtá-kumári, Musabbar; *Hind.*—Lal-kumárí.

The plant *Aloe officinalis* and several other species of the same genus, found wild and cultivated in India, belonging to the natural order *Liliaceæ* yield the medicinal aloes—*Musabbar*—of the bazar. The drug consists of the inspissated juice of the succulent leaves.

Medicinal uses.—A valuable purgative in very common use usually combined with other medicines. Myrrh and mastich are common adjuncts to prevent griping. The viscid mucilage obtained from the fresh LEAVES is used by the natives to some extent as an excellent demulcent. The fresh juice is regarded as cathartic, tonic and useful in fevers, and is used externally as an application in enlarged lymphatic glands, spleen and liver and in eye diseases.

ALPINIA GALANGA.

GALANGAL.

Vern.—*Beng.* and *Hind.*—Kulinjána ; *Sans.*—Kúlin-jána.

The RHIZOMES of *Alpinia Galanga*, belonging to the *Zingiberaceæ*, growing abundantly in Travancore, South Concans and Chittagong, are aromatic, pungent, and somewhat bitter, and are sold by native druggists. The "Lesser Galangal" (*A. officinarum*) of the European druggists is imported.

Medicinal uses.—The RHIZOMES are carminative and stomachic. They were at one time regarded as a suitable substitute for ginger. Galangal is sometimes used for chewing as a remedy for fœtid breath, and it is supposed to improve the voice.

ALSTONIA SCHOLARIS.

DITA BARK : ALSTONIA BARK.

Vern.—*Beng.*—Chhatin; *Hind.*—Chhatian; *Sans.*—Saptaparna ; *Bom.*—Satvin.

The bark of *Alstonia scholaris*, natural order *Apocynaceæ*, is thick and spongy. The tree is quite common throughout the Indian Peninsula. It yields an inferior quality of gutta-percha. The active principle of the bark has been isolated and named *Ditain*. It possesses powerful febrifuge properties.

Medicinal uses.—The BARK is an astringent tonic and febrifuge, useful in fever and in skin diseases. It is also used in bowel-complaints; bruised and mixed with water it is applied to ulcers, and as an application in rheumatic pains.

ALTHÆA OFFICINALIS.

MARSH-MALLOW: GUIMAUVE.

Vern.—*Hind.*—Gul-khairo.

This well-known *Malvaceous* plant is indigenous to the Punjab and Kashmir. The ROOT of this species and that of *A. rosea* yield a large percentage of a demulcent mucilage besides pectin and cane sugar.

Medicinal uses.—In the form of a syrup of the ROOT *Althæa* is largely employed as a demulcent. In pastilles in the form of *paté de guimauve* it is also frequently administered in Europe with beneficial effect in throat and chest affections. It is sometimes also applied as an emollient poultice. The LEAVES are used in this latter form. The SEEDS are considered demulcent, diuretic and febrifuge.

ALTINGIA EXCELSA.

Vern.—*Hind.*—Siláras; *Mal.*—Rasamala; *Bur.*—Nan-ta-yok.

This is a magnificent tree of the Indian Archipelago, common also in Burma and Assam. It yields a fragrant resin allied to the storax of *Liquidambar orientalis.* It belongs to the same order—*Hamamelideæ.*

Medicinal uses.—The RESIN is regarded as expectorant and stimulant, used usually in combination with other substances.

ALUMEN.

ALUM.

Vern.—*Beng.*—Phatkírí; *Hind.*—Phitkarí; *Sans.*—Sphatika; *Tam.*—Pati-káram; *Telu.*—Pati-kuram; *Pers.*—Zak-safed; *Arab.*—Shib.

Alum is manufactured to a considerable extent in India, chiefly at Kálábagh and Kutki in the Punjab. It is also

produced in the Behar and Cutch States. Indian alum is usually darker in colour than the imported article due to impurities, chiefly iron. It is manufactured from alum schist or shale. This is treated in a certain manner peculiar to each of the districts indicated, to produce sulphate of alumina which is combined with either a potash salt, or as at Kálábagh, with a salt called *jamsar*, consisting chiefly of sulphate of soda, so that the base of this is a soda alum the official alum having a potassium or ammonium base. Country alum is much cheaper than the imported article, and used chiefly for commercial purposes as a mordant and the like.

Medicinal uses.—Alum is a valuable internal and external stimulant. It is used as an astringent gargle in relaxed and inflamed sorethroat and as a lotion in leucorrhœa and ophthalmia.

AMARANTUS SPINOSUS.

THE PRICKLY AMARANTH.

Vern.—*Beng.*—Kántánatiá; *Hind.*—Cholái; *Sans.*—Tanduliya; *Guz.*—Kanta-mi-dant; *Tam.*—Muluk-kirai.

This thorny weed is widely distributed in the plains of India, especially in Bengal. Natural order *Amarantaceæ.*

Medicinal uses.—It is considered a valuable cooling diuretic. Its ROOT is efficacious in menorrhagia. It possesses mucilaginous properties. In the Mauritius a decoction of the LEAVES and ROOT is administered internally as a diuretic.

AMMANNIA BACCIFERA.

BLISTERING AMMANIA.

Vern.—*Beng.*—Dádmári; *Hind.*—Dád-mári; *Bom.*—Bhár-jambol; *Tam.*—Kallu-rivá; *Telu.*—Agniven-dra-paku.

An herbaceous shrub, belonging to the natural. order *Lythraceæ*. It is found in marshy places throughout India.

Medicinal uses.—The fresh bruised LEAVES have been used in skin diseases as a rubefacient and as an external remedy in ringworm and parasitic skin affections.

Blistering properties have been ascribed to the leaves, but this has not been found verified in practice.

AMMONIUM CHLORIDUM.

AMMONIUM CHLORIDE: SAL AMMONIAC.

Vern.—*Beng.*—Nishedal; *Hind.*—Nousádar; *Pers.*—Nóshádar; *Arab.*—Arminá.

This has been manufactured in India for centuries, chiefly in the Karnál District of the Punjab. A peculiar clay found in that region is roughly shaped into bricks, from which when heated in a specially constructed kiln exudes a very impure ammonium compound. This product is subsequently sublimed and yields a comparatively pure salt. It is used to a considerable extent in the arts by metal workers, and is easily obtained in the bazars.

Medicinal uses.—Used chiefly as an alterative in affections of the liver and spleen and in rheumatism. Useful in neuralgia. It has been found beneficial in affections of the throat. It makes a good freezing mixture with potassium nitrate and water. Liquid ammonia and other salts of ammonia are made from the chloride.

AMOMUM SUBULATUM.

THE GREATER CARDAMOM.

Vern.—*Beng.*—Bara elachi; *Hind.*—Bari elachi; *Sans.*—Elā; *Tam.*—Elam; *Telu.*—Yelakulu; *Pers.*—Qákilahe-kalán.

Several of the plants of the tribe *Zingiberaceæ* (natural order *Scitamineæ*) that yield the cardamoms of commerce are indigenous to India. The true cardamom, *Elletaria Cardamomum*, (q. v.) grows wild in the Cochin and Travancore forests and in Southern India generally. *A. subulatum* is found wild in the mountainous parts of India and in Nepal. The fruits are plentiful in the bazars and are a cheap and efficient substitute for the true cardamom. They are of about the size of a nutmeg.

Medicinal uses.—The SEEDS are agreeably aromatic, carminative and stimulant, but less heating than many other spices. Cardamom forms one of the ingredients of the masticatory used throughout India. Both in Indian and European medicine it is a frequent adjunct to other stimulants, bitters and purgatives, usually in the form of tincture or powder. An OIL is extracted from the seeds which is applied to the eyelids to allay inflammation.

AMOORA ROHITUKA.

Vern.—*Beng.*—Tikta-ráj, Pitráj; *Hind.*—Harin; *Sans.*—Rohitaka; *Tam.*—Shem-maram; *Telu.*—Chawa-manu.

An evergreen tree, of the natural order *Meliaceæ*, found in Bengal, Assam and Burma.

Medicinal use.—The BARK is considered astringent. The SEEDS yield an oil which is used as a stimulating liniment in rheumatism.

AMORPHOPHALUS CAMPANULATUS.

THE TELINGA POTATO.

Vern.—*Beng.*—Ol; *Hind.*—Zamin-kand; *Sans.*—Súrana, olla; *Tam.*—Karuna, sooran; *Telu.*—Muncha-kunda.

The *Amorphophalus campanulatus*, natural order *Aroideæ*, is native to and cultivated throughout India and Ceylon for the sake of its tubers which are cooked and eaten by the natives like yams or potatoes.

Medicinal use.—Useful in hæmorrhoids, one of its Sanskrit synonyms being *Arsaghna* or curer of piles.

AMYGDALUS COMMUNIS.

THE ALMOND.

See PRUNUS AMYGDALUS.

ANACARDIUM OCCIDENTALE.

THE CASHEW-NUT.

Vern.—*Beng.*—Hijlí-Bádám; *Hind.*—Kájú; *Tam.*—Kola mara; *Telu.*—Idi-mamidi; *Bom.*—Kájú.

The cashew tree abounds on the sea-coasts of India and other tropical countries. It belongs to the natural order *Anacardiaceæ*. The kernel has a sweet and agreeable taste, and is eaten with relish when roasted. The oil obtained from it by expression is exactly similar to olive oil, the finer qualities being quite equal to almond oil. A gum that exudes from the bark resembles gum arabic, but is only partially soluble in water and consists of true gum and bassorine. The pericarp of the nut contains a black acrid oil called cardole or cashew-apple oil. It is applied to the floors and wooden rafters of houses to prevent the attacks of white-ants, and used by book-binders with a similar object.

Medicinal uses.—The OIL from the kernel is nutritious and emollient. Internally used as a demulcent in the form of emulsion. It may be used in pharmacy like olive oil. The acrid oil possesses rubefacient and vesicant properties. The active principle is *Anacardic Acid.* It has been used as a local stimulant in leprosy and psoriasis.

ANACYCLUS PYRETHRUM.

Vern.—*Beng.* and *Hind.*—Akarkará; *Sans.*—Akarkarava; *Tam.*—Akkarakarum.

The root of *Anacyclus pyrethrum* (*Anthemis pyrethrum*), natural order *Compositæ,* the common pellitory.

Medicinal uses.—The ROOT is a valuable sialogogue. It is powerfully irritant, and has been found successful in toothache. It is frequently employed in gargles. An infusion of this drug is useful in cases of rheumatism.

ANAMIRTA COCCULUS.

COCCULUS INDICUS.

Vern.—*Hind.*—Kákmári; *Bomb.*—Kákaphala.

Natural order *Menispermaceæ.* Found in Southern and Eastern India and Burma. The poisonous berries constitute the *Cocculus indicus* of commerce, which is the source of *picrotoxin,* a highly poisonous, crystallizable bitter principle. The fruits contain also about 50 per cent. of oil.

Medicinal uses.—The FRUITS are not used medicinally except occasionally in the form of an ointment which is applied as an insecticide. They have been employed as a substitute for the bitter principle of hops in the manufacture of beer. *Picrotoxin* is employed for checking night sweats of phthisis and as an antidote in morphine and chloral poisoning.

ANANAS SATIVA.

THE PINEAPPLE.

Vern.— *Beng.*—Anáras; *Hind.*— Ananas; *Guz.*— Anaras; *Tam.*— Anáshappahane; *Telu.*— Anánash-pandu; *Arab.* — Aainunnás.

Natural order *Bromeliaceæ*. This plant, which yields the well-known delicious fruit, is largely cultivated in India.

Medicinal uses.—The fresh juice of the LEAVES is regarded as anthelmintic. The fruit itself is antiscorbutic.

ANDROGRAPHIS PANICULATA.

CREAT.

Vern.—*Beng.*—Kálmegh; *Hind.*—Kiryát; *Sans.*—Kirata; *Tam.*—Nilavembu; *Telu.*—Nelu-veum; *Pers.*—Nainehavandi.

The plant *Andrographis paniculata* grows wild all over Bengal. It belongs to the natural order *Acanthaceæ*. The whole PLANT is intensely bitter and yields its properties readily to water or spirit. It is sometimes called Indian Chiretta and frequently confused with the real herb of that name. One of the vernacular names for the Creat is *Mahātika*—King of bitters.

Medicinal uses.—It is a powerful bitter tonic and has been successfully used in cases of dysentery and diarrhœa. This is the basis of the well-known domestic medicine *alui* which is a composition of carminatives formed into pills with the fresh juice of its leaves and preserved after being dried in the sun. It is frequently given with advantage to infants suffering from flatulence and diarrhœa caused by defective digestion. It also forms an ingredient of the celebrated French nostrum the *Droguamere*. It has properties similar to quassia, and is useful in general

debility, in convalescence after fever, and in advanced stages of dysentery. During the late outbreak of influenza a tincture of the plant was found highly efficacious in arresting the progress of the disease.

ANDROPOGON CITRATUS.

LEMON-GRASS.

Vern.—*Beng.*—Gandha benâ; *Sans.*—Bhústrina.

This grass (*Graminaceæ*) is extensively cultivated throughout India. The well known fragrant volatile oil known as lemon-grass or Indian *Melissa* oil is obtained by distillation with water from the fresh plant. It is largely used in perfumery, and very frequently employed to adulterate oil of verbena which it somewhat resembles.

Medicinal uses.—The OIL is stimulant, carminative, antispasmodic and diaphoretic: locally rubefacient. Useful in flatulent colic and gastric irritability. In cholera it proves serviceable not only by allaying and arresting the vomiting but by aiding the process of reaction. Externally applied it forms an excellent embrocation in chronic rheumatism, neuralgia, sprains, and other painful affections.

ANDROPOGON MURICATUS.

CUSCUS: KHUS-KHUS: VETI-VERT.

Vern.—*Beng.*—Benâ, Khus-Khus; *Hind.*—Khas-Khas; *Sans.*—Usira, Virana; *Tam.*—Vette-ver; *Pers.*—Savandra-múl.

This is another of the numerous species of *Andropogon* which yield the fragrant grass oils of commerce. It is a

large grass native to the Coromandel and Mysore coasts, and found abundantly in moist ground in Bengal and Burma. The long fibrous ROOT of this plant is well known as the Khus-Khus of which door-screens—*tatties*—or aromatic scented mats are made. They are kept constantly wet, thus cooling and agreeably perfuming the atmosphere during the hot weather. On distillation with water the roots yield a fragrant oil, the well-known *khas-khas-ka-atar*, so much valued in English and Indian perfumery.

Medicinal uses.—The powdered ROOT is regarded as cooling, refrigerant, stomachic and useful in pyrexia, thirst, irritability of the stomach, &c., but it is not of much importance medicinally. Externally it is occasionally used in the form of a paste of the root to relieve oppressive heat of the skin. An infusion of the root is used internally as a gentle stimulant, and the essence or otto is similarly used in small doses.

ANDROPOGON NARDUS.

CITRONELLA.

Vern.—*Beng.*—Kamá-Khér; *Hind.*—Ganjní; *Sing.*—Maana.

This grass is quite common in the North-West Provinces and the Punjab, and very largely cultivated in Ceylon and Singapore for the valuable oil it yields. The oil is a very important product in perfumery.

Medicinal uses.—Citronella oil is regarded as officinal by the *Pharmacopœia of India*. It is little used medicinally, but may be regarded as having properties similar to those of *A. citratus*, especially in rheumatism. The leaves are occasionally used in the form of infusion.

ANDROPOGON SCHŒNANTHUS.

THE GERANIUM GRASS.

Vern.—*Beng.*—Agyá-ghâs, Roshel; *Hind.*—Rúá-ghás rusa-ka-tel (the oil); *Mad.*—Roshet.

This, another of the fragrant *Graminaceæ*, is indigenous to Central India, the North-West Provinces and the Punjab. The oil distilled from the leaves is of a pale sherry colour, and has an agreeable odour resembling, especially in its purified forms, that of otto of roses, which it is extensively used to adulterate. Its taste is sharp and agreeable, approaching that of oil of lemons. The oil is also known in commerce as "rusa" (probably a corruption of rose) oil, "nimar oil," and "oil of ginger grass." It is very extensively employed in soap-making and perfumery.

Medicinal uses.—Stimulant, carminative, antispasmodic and diaphoretic. Locally applied it is a rubefacient. It is found useful in flatulence and spasmodic affections of the bowels. Externally it is commonly used in chronic rheumatism, neuralgia, sprains, &c., with excellent effect. It can be used as a substitute or in conjunction with cajeput oil.

ANONA SQUAMOSA.

THE CUSTARD APPLE.

Vern.—*Beng.*—Ata, Sitaphal; *Hind.*—Sharifa; *Tam.*—Sita-palam; *Telu.*—Sita-pandu.

The custard apple is a small tree of the natural order *Anonaceæ*, which is cultivated almost all over India for its fruit.

Medicinal use.—The ripe FRUIT externally applied is considered maturant, and is also used to hasten suppuration in cases of malignant tumours. The LEAVES, the SEEDS and the UNRIPE FRUIT possess insecticide properties. The ROOT is a violent purgative.

ANTHEMIS NOBILIS.

Syn.—MATRICARIA CHAMOMILA.

CHAMOMILE.

Vern.—*Beng.*—Babúnah-phul; *Hind.*—Babúna-ke-phul; *Pers.*—Bábúnah; *Arab.*—Bábúnaj.

The dried flowers of the plant *Anthemis nobilis*, natural order *Compositæ*. It is a native of Europe and Persia, but cultivated in India and chiefly in the Punjab; available in all the bazars.

Medicinal uses.—Stomachic, antispasmodic, carminative and tonic in dyspepsia and general debility. The warm infusion in large doses is sometimes used to promote the action of emetics; useful in hysteria, and in suppression of menses. Chamomile also acts as a vermifuge. Externally, an infusion or decoction or cataplasm of the FLOWERS is used to relieve pain. The essential OIL obtained by distillation possesses antispasmodic properties.

ANTHEMIS PYRETHRUM.

See ANACYCLUS PYRETHRUM.

ANTHOCEPHALUS CADAMBA.

Syn.—SARCOCEPHALUS CADAMBA.

Vern.—*Beng.*—Kadām; *Hind.*—Kadamb; *Tam.*—Vella, cadamba; *Telu.*—Kadambe.

This tree, natural order *Rubiaceæ*, is found in Eastern and Northern India.

Medicinal uses.—The BARK has been used as a febrifuge and the LEAVES occasionally in the form of a gargle.

ANTIARIS TOXICARIA.

THE UPAS TREE.

Vern.—*Tam.*—Nuttavil; *Burm.*—Mya-sheik.

This is a large tree, belonging to the natural order *Urticaceæ*, found in Burma, the Indian Archipelago and Ceylon. It is the source of a most powerful arrow-poison which is believed to contain a medicinal principle of some value. The arrow-poison is a gum resinous exudation from incisions in the trunk. The physiological effects of this poison, which has been called *antiarin*, resemble those of strychnine, which alkaloid has indeed been found in the poison.

ANTIMONIUM.

ANTIMONY: BLACK ANTIMONY.

Vern.—*Beng.*—Surmâ; *Hind.*—Surmah-ká-patthar; *Sans.*—Kohal; *Bom.*—Surmah-i-isfahani; *Pers.*—Sangi-surmah.

A native tersulphide of antimony purified by fusion and reduced to a black powder. It is found in several parts of the Punjab but not produced to any extent. It is not used in the arts by the natives of India. It is applied by native women in Upper India as a cosmetic to the tarsus of the eye, to improve the personal appearance. When thus applied is also supposed to protect the eyes from the glare of the sun by absorbing the rays.

Medicinal uses.—It is seldom employed medicinally; occasionally as a tonic for horses.

APLOTAXIS AURICULATA.

See SAUSSUREA HYPOLEUCA.

APIUM GRAVEOLENS.

CELERY.

Vern.—*Beng.*—Randuni ; *Hind.*—Ajmodh.

The plant, belonging to the natural order *Umbelliferæ*, is a native of Europe, but now cultivated in India as a garden crop. The seeds are used as a spice.

Medicinal use.—The ROOT is alterative and diuretic and is prescribed in anasarca and colic. The SEEDS are stimulant and carminative.

APIUM PETROSELINUM.

See PETROSELINUM SATIVUM.

AQUILARIA AGALLOCHA.

CALAMBAC : EAGLE WOOD.

Vern.—*Beng.*—Agaru ; *Hind.*—Agar ; *Sans.*—Aguru ; *Tam.*—Aggalichandana ; *Telu.*—Agru ; *Pers.*—Ayalur-che.

The wood of this tree (natural order *Thymelaceæ*), contains scattered through it the fragments of sweetly-scented Agar RESIN, which is highly prized by the natives of India. It is probably a degradation product of the wood.

The wood is used in the composition of incense or in the production of a fragrant OTTO—*agar-ka-atar*. It is seldom used medicinally.

ARACHIS HYPOGÆA.

THE GROUND-NUT OR EARTH NUT.

Vern.—*Beng.*—Chiner-bádám, Matkalai ; *Hind.*—Mungphalif ; *Sans.*—Buchanaka ; *Tam.*—Verkadalai ; *Telu.*—Vernsana-gakaya ; *Bom.*—Bhúi-chane.

The legumes of *Arachis hypogæa*, a plant of the natural order *Leguminosæ*, ripen beneath the surface of the soil. The plant is cultivated in India, chiefly in the Madras and

Bombay Presidencies, and the shelled nuts and oil form a most important article of export from Pondicherry and other places. They yield by expression about 40 to 50 per cent. of a clear straw-coloured edible OIL—the Nut Oil of commerce. It has a specific gravity of about 0·918. It possesses a faint odour and a very mild agreeable taste. It contains *Oleic, Hypogœic, Palmitic* and *Arachi acids.* Arachis oil is highly esteemed for domestic purposes, and does not become rancid so quickly as other oils. It can be used for all purposes in pharmacy in place of olive or almond oil, the latter of which it is used to adulterate. The seeds themselves,—"pea-nuts,"—are very popular as a dietary in many parts of India, Africa and America.

Medicinal uses.—The OIL is regarded by natives of this country as an excellent aperient and emollient. All that can be said of it is that it answers very well in place of the oils indicated.

ARECA CATECHU.

THE ARECA OR BETEL-NUT PALM.

Vern.—*Beng.*—Gua, Supári; *Hind.*—Supári, chheli; *Sans.*—Gubák; *Pers.*—Pópal.

The tree *Areca Catechu,* of the natural order *Palmæ,* is extensively cultivated in Bengal and Madras and along the sea coast of India and Burma for its fruit—the Areca or Betel-nut of commerce. It is the most graceful and elegant of the Indian palms. The KERNEL of the fruit is one of the constituents of the universal masticatory (*pan-supari*), the "betel" of the East. Slices of the nut with a little catechu and several spices, according to the means and taste of the individual, are wrapped up in a leaf of the *Piper betel* or Betel vine, and having been smeared with a little shell-lime are chewed by the natives. Areca

nut contains *tannic* principles, fatty and colouring matters, and several alkaloids chiefly *Arecoline*. The tree yield a brown variety of *Catechu*, known in the market as Bombay catechu.

Medicinal uses.—The unripe NUTS are laxative and carminative. The fresh nuts have intoxicating properties and produce giddiness. The dried nuts are used to sweeten the breath and strengthen the gums, and the powder is therefore frequently combined in dentifrices. The burnt nut (areca charcoal) is also used as a dentifrice. Areca has some reputation as an anthelmintic, especially in animals.

ARGEMONE MEXICANA.

THE MEXICAN OR PRICKLY POPPY.

Vern.—*Beng.*—Siál kántá; *Hind.*—Fringhi Dhutura; *Sans.*—Srigála kantaka.

An American plant (natural order *Papaveraceæ*), which now grows wild nearly all over India. The seeds yield a large quantity of OIL of a pale yellow colour and clear, resembling that of the poppy but possessing a disagreeable smell. The whole plant abounds with a yellow JUICE resembling gamboge.

Medicinal uses.—The SEEDS are laxative and stomachic, emetic, expectorant and demulcent. Applied to herpetic eruptions and other skin diseases the OIL exercises a soothing influence. It is also useful as a local application in indolent ulcers.

ARGENTUM.

SILVER.

Vern.—*Beng.*—Rúpá; *Hind.*—Chándi; *Sans.*—Raupya.

Medicinal uses.—Silver leaf is very frequently prescribed in native medical practice and often combined with gold

It is supposed to be effective in nervous diseases. In the form of oxide it is also employed as a nervine tonic.

ARGYREIA SPECIOSA.

THE ELEPHANT CREEPER.

Vern.—*Beng.*—Bichtarák; *Hind.*—Samandar-ká-pát; *Sans.*—Vriddha dáraka; *Tam.*—Shamuddirap-pach-chai; *Telu.*—Samudrapala.

This twining plant (natural order *Convolvulaceæ*), is found all over India.

Medicinal uses.—The ROOT is regarded as alterative and tonic: useful in rheumatism and diseases of the nervous system. The LEAVES are used by the natives as a local stimulant and rubefacient in skin diseases.

ARISTOLOCHIA INDICA.

THE INDIAN BIRTHWORT.

Vern.—*Beng.*—Isarmül; *Hind.*—Isarmül. *Sans.*—Arkamulá; *Tam.*—Ich-chura-mutiver; *Pers.*—Zaravandi hindi.

Aristolochia indica (*Aristolochiaceæ*) is a twining perennial growing all over India.

Medicinal uses.—The ROOT of this as well as of other species of *Aristolochia*, possesses a nauseous bitter taste, and is a powerful emmenagogue and antiarthritic. It is perhaps the best antidote to the bites of poisonous insects, being used both externally and internally. Mixed with honey it is given in white leprosy. It is also considered useful in dropsy. Macerated with black pepper-corns it is given in cases of cholera and diarrhœa with much benefit. The fresh LEAVES applied to the stomach of a child remove constipation.

ARSENIUM.

ARSENIOUS ACID.

ARSENIC: WHITE ARSENIC.

Vern.—*Beng.*—Sankhia, Senko bish, Sanbul-khar; *Hind.*—Safed-sanbul; *Sans.*—Sámbala-kshara; *Pers.*—Marg-mosh.

The ores of arsenic are not worked to any extent in India, but the drug is easily obtained in a pure state in all the bazárs. It is chiefly imported from China. Its uses in medicine and pharmacy are well known. It is extensively employed in India in the treatment of obstinate intermittent fever.

Orpiment—the yellow sulphuret—(*jorode senko*) and Realgar—the red sulphuret—(*munchal*) are also employed in Hindu medicine.

ARTEMISIA MARITIMA.

WORM-SEED: SANTONICA.

Vern.—*Hind.*—Kírmálá; *Bom.*—Kirmáni; *Arab.*—Shíh or Shib; *Pers.*—Shih, Darmanah.

The minute dried FLOWER-HEADS of *Artemisia maritima* which grows at high altitudes on the Western Himálaya. Natural order *Compositæ*. They contain an important glucoside *Santonin*.

Medicinal uses.—The FLOWER-HEADS or "Worm-seed" are anthelmintic, deobstruent and stomachic. *Santonin* is very frequently prescribed for the removal of intestinal and thread worms. As used in India it is mostly imported.

ARTEMISIA VULGARIS.

Vern.—*Beng.*—Dona; *Hind.*—Nágdoná; *Sans.*—Nágdamani; *Tam.*—Machipatri; *Telu.*—Daranama.

The plant *Artemisia vulgaris* (natural order *Compositæ*), a native of Nepal, and found throughout the mountain

tracts of India, is the Indian wormwood. It yields a volatile essential oil on distillation known as *Dona-ka-atar*.

Medicinal uses.—The LEAVES and FLOWERING TOPS are administered in the form of infusion for nervous and spasmodic affections. Wormwood is also employed as a vermifuge.

ARTOCARPUS INTEGRIFOLIA.

THE JACK FRUIT TREE.

Vern.– *Beng.*—Kánthál ; *Hind.*—Panas ; *Mar.*—Phanas ; *Tam.*—Pilá ; *Telu.*—Pansa.

A large tree of the natural order *Artocarpeæ*, cultivated all over India for its fruit.

Medicinal uses.—The products of the Jack-fruit tree are not much used for medicinal purposes. The ripe FRUIT is considered an antidote to all kinds of animal poison. The MILK is applied to glandular swellings and abscesses to promote suppuration, the young LEAVES are used in skin diseases, and the ROOT is given internally in diarrhœa.

ASAFŒTIDA.

See FERULA NARTHEX.

ASPARAGUS ADSCENDENS.

Vern.—*Hind.*—Sufed musli, Satáwar.

A plant of the natural order *Liliaceæ*, found in Northern India.

Medicinal uses.—The tuberous ROOT of this plant is the true *sufed musli*, of Indian practitioners, by whom it is highly valued for its demulcent properties. It is often used as as ubstitute for *salep-misri*.

ASPARAGUS SARMENTOSUS.

Vern.—*Beng.*—Satamuli; *Hind.*—Sátávari; *Sans.*—Satávari, Satamuli; *Telu.*—Challa; *Arab.*—Shakálgul.

This plant, belonging to the natural order *Liliaceæ*, is found in Upper India, the Concans and Deccan.

The Sanskrit name *Satamuli* (possessing a hundred roots) is in allusion to the numerous fusiform tubers of this plant. The tubers are candied and taken as a sweetmeat. They are sometimes confused with *A. adscendens.*

Medicinal uses.—The ROOT is reputed as a good demulcent and alterative tonic, diuretic, and aphrodisiac. The fresh juice is given with honey as a demulcent.

ASPIDIUM FILIX MAS.

See NEPHRODIUM FILIX-MAS.

ASTERACANTHA LONGIFOLIA.

See HYGROPHILA SPINOSA.

ASTRAGALUS VIRUS.

TRAGACANTH.

Vern.—*Beng.*—Katila; *Hind.*—Anjírá.

Natural order *Leguminosæ.* This is found in the Himálaya and yields in small quantities an excellent Gum Tragacanth, which exudes during the hot season through the bark in slender threads, which gradually increase, harden and form tears or worm-like pieces. This GUM forms the basis of some medicinal lozenges and styptic powder, and is extensively used as a demulcent. In the arts it is highly valued as an ingredient in dye-stuffs and as a glaze for calico and silks.

Medicinal uses.—Emollient and demulcent. It is very useful in the irritation of the mucous membranes of the pulmonary and genito-urinary organs. It is chiefly used as a vehicle for more active medicines.

ATROPA BELLADONNA.

DEADLY NIGHTSHADE.

Vern.—*Beng.*—Yebruj; *Hind.*—Angûr-shéfa.

This valuable plant (natural order *Solanaceæ*), is found in great abundance on the Himálaya extending from Simla to Kashmír, at altitudes varying from 6,000 to 12,000 feet. It is extensively employed in modern medicine. It is not found in the bazárs except those of Northern India, most of the drug employed being imported unnecessarily. The LEAVES and dried ROOT are official in the *British Pharmacopœia*. All parts of the plant contain *Atropine* and *Hyoscyamine*. (*See also* Hyoscyamus.)

Medicinal uses.—Belladonna is powerfully sedative, anodyne and antispasmodic. The ROOT is used chiefly in the preparation of the alkaloid *Atropine*, the active principle, which is extensively used in ophthalmic practice. A liniment is also made from the root which is invaluable as an anodyne application in rheumatic and neuralgic pains. Internally it is chiefly used as a tincture of the leaves. A standard strength for preparations of belladonna would be desirable. Atropine is antagonistic to aconite, morphine, Calabar bean (pilocarpine) and the effects of poisonous fungi.

AURUM.

GOLD.

Vern.—*Beng.*—Soná; *Hind.*—Soná; *Sans.*—Suvarna, swarna.

Gold leaf is used to a considerable extent by the *kabirajs* (Bengali physicians) combined with silver leaf or arsenic and sometimes with mercury in various forms, chiefly for nervous diseases. They suppose that it improves the memory and intellect. It is probable that with some of their patients, faith in the efficacy of the remedy is in proportion to its cost.

AZADIRACHTA INDICA.

See MELIA AZADIRACHTA.

BALIOSPERMUM MONTANUM.

Vern.—*Beng.*—Dantimul; *Hind.*—Danti; *Sans.*—Danti.

A common shrub of Northern and Eastern Bengal, belonging to the natural order *Euphorbiaceæ*.

Medicinal uses.—The SEEDS are administered as a drastic purgative. Like croton seeds, for which they are occasionally substituted, they are boiled in milk before use. The ROOT of the plant is cathartic. Both are much used in Hindu medicine as purgatives.

BALSAMODENDRON MUKUL.

GUM GUGUL.

Vern.—*Beng.*—Guggul, Mukul; *Hind.*—Gúgal; *Sans.*—Guggula.

The tree *Balsamodendron Mukul* (natural order *Burseraceæ*), is a native of Sind, Rajputana, Eastern Bengal and Assam. It yields the guggul gum, the Indian Bdellium, but probably there are other species of the same genus which yield the same product—*B. Roxburghii, pubescens*, and *Berryi*. The gum is collected in the cold season by making incisions in the tree and letting the resin fall on the ground. This accounts for the dirty condition in which it is usually found in the shops. It is a GUM RESIN and sometimes used in place of myrrh, being much cheaper. It is largely used by the Hindus as an incense in their religious ceremonies, the surrounding atmosphere becoming impregnated with its agreeable odour.

Medicinal uses.—Demulcent, aperient, alterative and carminative. It is used in rheumatism, nervous diseases, scrofulous affections, urinary disorders and skin diseases.

BALSAMODENDRON MYRRHA.

MYRRH.

Vern.—*Beng.*—Hírából ; *Hind.*—Ból ; *Pers.*—Ból.

The solid GUM RESIN obtained from the bark of the tree *Balsamodendron Myrrha* (natural order *Burseraceæ*). It exudes in a soft oily state, but soon hardens by exposure to air. It has an aromatic and balsamic odour and a bitter, aromatic taste. There are three varieties of this article in commerce, each differing in appearance and each embracing several grades of different commercial value. The great myrrh market of the world is at Bombay, where it is exchanged for English and Indian goods, reassorted and exported to Europe. It has been used from time immemorial as an incense.

Medicinal uses.—Stimulant, expectorant and emmenagogue; useful in dyspepsia and in amenorrhœa, chlorosis and other atonic uterine affections. It is also useful as an expectorant in chest affections, especially in asthma. Externally it is used as an astringent and stimulating application in ulcerated conditions and a valued wash for the mouth and gums, and gargle in ulcerated sore-throat.

BAMBUSA ARUNDINACEA.

BAMBOO.

Vern.—*Beng.*—Báns ; *Hind.*—Báns ; *Sans.*—Vansa.

In addition to the innumerable uses to which the various species of bamboo (natural order *Gramineæ*), are put in India they are used to some extent medicinally. The

bamboo is said to flower only once in 30 or 40 years and only in seasons of great drought so that it has been considered a precursor of famine.

Medicinal uses.—The siliceous concretion found in the joints of the female bamboo is called *Bansa rochana* in Sanskrit and in Hindi *Tabashir*, and is largely used in homœopathic medicine as a sweet cooling tonic, aphrodisiac and useful in cough, consumption, asthma, &c. The LEAVES are regarded as emenagogue.

BARILLA.

CRUDE CARBONATE OF SODA.

Vern.—*Beng.*—Sajjí-mátí ; Khar-sajji.

This is a white efflorescence on the soil known usually as *reh*, found in many parts of India. A purer form of *Barilla* is also obtained from the ash of certain indigenous plants, chiefly *Caroxylon Griffithii*. As collected in Northern Bengal and in Bombay and many other districts *reh* is used as *dhobie's* or fuller's earth for washing purposes and in the manufacture of a crude country soap. It contains on an average 30 to 50 per cent. of carbonate of soda, which is easily separated by a simple process of lixiviation and has been produced in India on a commercial scale.

BARRINGTONIA ACUTANGULA.

Vern.—*Beng.*—Ijál ; *Hind.*—Samundar-phal ; *Sans.*—Hijjala.

An evergreen tree, belonging to the natural order *Myrtaceæ*, found plentifully in Bengal and extending to the lower Himálaya; found also in Central and South India and Burma. The SEEDS, which are about the size of a nutmeg, are used to some extent in native medicine. They contain *Saponin*.

Medicinal uses.—The powdered SEED in doses of a few grains is given to children as an expectorant and emetic. The LEAVES and ROOT are bitter tonics.

BASSIA BUTYRACEA.

THE INDIAN BUTTER TREE.

Vern. (The oil)—*Hind.*—Phulwa ; Phulwara.

A deciduous tree of the Sub-Himálayan tract, natural order *Sapotaceæ*. The SEEDS yield on expression a concrete OIL or vegetable butter, which is used to some extent as a dietetic. It is also used externally in rheumatism.

BASSIA LATIFOLIA.

THE INDIAN BUTTER TREE.

Vern.—*Hind.*—Mahuá ; *Sans.*—Madhuka.

This valuable and most important tree is indigenous to and entensively cultivated nearly all over India for its flowers and fruit. It belongs to the natural order *Sapotaceæ*. It flowers in February and March. The FLOWERS form an important article of food among some of the poorer classes. The seeds yield by expression a large quantity, about 30 per cent., of concrete OIL used by the natives as a substitute for Kokum butter for culinary purposes, in adulterating *ghí* (clarified butter), for burning and in soap-making. The spirit produced from the flowers, when carefully distilled, somewhat resembles Irish Whisky. It is called Mahuá Wine, and manufactured to a considerable extent in several parts of India, while the flowers form an important article of export, being used in the preparation of an inferior kind of brandy.

Medicinal uses.—The spirit is astringent, tonic and appetizing. It is a powerful diffusable stimulant. The flowers are cooling, tonic and nutritive.

BASSORA GUM.

GUM HOG, HOG TRAGACANTH.

This name is given collectively to the product of a number of Indian gum-yielding trees which is occasionally found as an adulterant of gum tragacanth. It is known in the bazárs as *Katira*. It is a very inferior gum and of an objectionable dark colour.

BAUHINIA VARIEGATA.

Vern.—*Beng.*—Rakta-Kánchán; *Hind.*—Kachnar; *Sans.*—Kanchanara.

This tree is found in the Sub-Himálayan region and throughout the forests of India and Burmah. It belongs to the natural order *Leguminosæ*. The BARK yields a brown-coloured GUM known as *Semla-gónd*.

Medicinal uses.—The bark of *Bauhinia variegata* is described as alterative, tonic, astringent and useful in scrofula, skin diseases and ulcers.

BENINCASA CERIFERA.

THE WHITE GOURD MELON.

Vern.—*Beng.*—Kumrá; *Hind.*—Gol-kaddú; *Sans.*—Kushmánda; *Bom.*—Kohala.

Cultivated largely in Bombay and the Deccan. It very much resembles the pumpkin (*Cucurbita pepo*) in appearance and belongs to the same natural order. It may

frequently be seen growing on the thatched roofs of huts in Bengal. It is cooked in curries and made into sweetmeats. A waxy secretion is found on the outside of the fruit in sufficient quantity to be collected.

Medicinal uses.—The SEEDS possess anthelmintic properties and are useful in cases of tænia. The expressed OIL of the seeds in doses of half an ounce repeated at an interval of two hours and followed by an aperient is said to be equally efficacious. The JUICE of the ripe fruit is considered efficacious in hæmoptysis and other internal discharges, and has been found particularly beneficial in phthisis.

BERBERIS ARISTATA, B. LYCIUM, and other Species.

THE INDIAN BARBERRY.

Vern.—*Beng.*—Darhaldi; *Hind.*—Rasaut, Rusot, Chitra; *Sans.*—Dáruharidrá. *Pers.*—Fil-zahrah; Jir-khár.

The barberry bushes grows on the Nilgiris and all over the Himálaya, whence the root and the root-bark could be obtained in great quantities. They belong to the natural order *Berberideæ*. The ROOT occurs in pieces varying in thickness from 2 or 3 to 6 or 8 inches and in length from 10 to 12 inches. It is yellow externally and bitter in taste The active principle is the alkaloid *Berberine*.

Medicinal uses.—The ROOT-BARK, administered in the form of the tincture, which is official in the *Pharmacopœia of India*, is antipyretic, antiperiodic, diaphoretic and tonic. It is greatly used in cases of remittent fever. As a diaphoretic and antipyretic it is considered equal to quinine and Warburg's tincture, and as a diaphoretic may be used as a substitute for James' Powder. As an antiperiodic it

has some advantage over quinine and cinchona, inasmuch as frequently repeated doses do not produce depression of the system or deafness, and it may be used during the attack of fever. It is also used as a local application in affections of the eyelids, a crude EXTRACT—known as *Rasaut*—being prepared for this purpose. In chronic ophthalmia this has been used with success painted over the eyelids and occasionally combined with opium and alum. It is also used as a febrifuge in doses of half a drachm.

BIXA ORELLANA.

ANNATTO OR ARNATTO.

Vern.—*Beng.*—Latkan; *Hind.*—Latkan; *Bom.*—Kisri.

This plant, although not indigenous, as sometimes erroneously stated, is extensively cultivated in India for the valuable dye-stuff which it yields. It belongs to the natural order *Bixineæ*. The orange-red dye—annatto—is obtained by boiling the seeds in water, the pulpy matter which constitutes the colouring matter being thus separated. It is extensively used as a colouring for butter, cheese, etc. It is also used to colour pomatums and toilet preparations.

BLUMEA LACERA.

Vern.—*Beng.*—Kukursunga; *Hind.*—Kakróndá; *Sans.*—Kukuradru; *Bom.*—Nimúrdi.

A common weed to be found all over India, plentiful on the Himálaya and extending to Ceylon. It belongs to the natural order *Compositæ*. Several species of *Blumea*, particularly *B. balsamifera* and *B. densiflora* yield a stearoptene which has been found identical with camphor.

Medicinal uses.—The DRIED HERB has been employed as a febrifuge, astringent in hæmorrhages, deobstruent and

stimulant. An astringent eye-lotion has also been prepared from the LEAVES.

BŒRHAAVIA DIFFUSA.

Vern.—*Beng.*—Punarnabá; *Hind.*—Gadha-purna.

A troublesome weed of the natural order *Nyctagineæ*, found all over India. There are two kinds: one with white, and the other with red, flowers. The former is used in medicine.

Medicinal uses.—The ROOT of the plant used in infusion or given in powder is considered laxative, diuretic, anthelmintic and cooling. It has also expectorant properties, and has been prescribed with advantage in cases of asthma. In large doses it acts as an emetic.

BOMBAX MALABARICUM.

THE SILK COTTON TREE.

Vern.—*Beng.*—Simul, Semul; *Hind.*—Semal; *Sans.*—Mocha *Bom.*—Semul, Shembal.

A GUM obtained from this plant (natural order *Malvaceæ*), is very frequently to be met with in the Indian bazárs. It is known as *Mócharas*, and is usually in roundish tears of a dirty brown colour and hollow, somewhat resembling galls in general appearance with an astringent taste. They are sometimes also known as *Supari-ka-phul*. The silky portion of the seed forms a good substitute for cotton. The seeds also yield a good drying oil.

Medicinal uses.—The *Mócharas* gum contains a large proportion of tannic and gallic acids and may be employed in cases where an astringent is indicated. It has been

found useful in diarrhœa, dysentery and menorrhagia and as an aphrodisiac, while it has been employed as a styptic. The ROOTS known as *Musla* or *Semul Musla* have stimulant and tonic properties attributed to them.

BORASSUS FLABELLIFORMIS.

THE PALMYRA OR FAN PALM.

Vern.—*Beng.*—Tál; *Hind.*—Tár; *Sans.*—Tála, Trinaráj.

This noble and useful palm (*Palmæ*) inhabits dry sandy soils in most parts of India. The leaves were used for writing on by the ancient Hindus. The letters were engraved upon them by means of a pointed iron style. This system of writing is still extant in Orissa and Travancore. In the rural schools of Bengal the leaves are written upon with pen and ink as upon paper, the children washing them clean again at the nearest tank when the day's lesson is finished.

Medicinal uses.—The saccharine JUICE obtained by excision of the spadix is cooling, sweet and useful in inflammatory dropsy. The fermented juice, called *Tarí* (toddy), is intoxicating: it is largely consumed in several parts of India, and spirit may be distilled from it. From an analysis made by the author some years ago it was found that the toddy, after exposure to the sun for ten hours, ferments and very closely resembles in its constituents—alcoholic, nutritive and otherwise—those of beer. The sediment of the toddy forms a yeast which is largely used in bread-making. Sugar is manufactured from it in Madras, Burma, and Ceylon. Sugar is not made from it in Bengal but sugar-candy obtained from this palm is imported into Calcutta from

Ceylon. The yellow pulp surrounding the ripe NUTS is sweet, heavy and indigestible. It is made into cakes with flour and other ingredients. The young SEEDS contain a clear watery fluid which is very refreshing and cooling. The kernel of the seeds after the seedlings have germinated is eaten. The terminal BUDS of the *Tál* tree are regarded as nutritive, diuretic and tonic. The ashes of the flowering stalk are said to be useful in enlarged spleen. The 'toddy poultice' is a valuable stimulant application to gangrenous ulcerations, carbuncle and indolent ulcers. The sugar-candy produced in the manufacture of sugar from this palm is used in coughs and pulmonary affections.

BOSWELLIA SERRATA.

THE INDIAN OLIBANUM.

Vern.—*Beng.*—Gandhabiroja, Lubán; *Hind.*—Sálgá, Kundur; *Sans.*—Kunduru, Guggulu; *Pers.*—Kundur.

This tree (natural order *Burseraceæ*) is a native of the mountainous tracts of Central India and very common in Shahabad. The GUM RESIN, (Indian olibanum) has a balsamic and resinous odour and a bitter and aromatic flavour. It is largely consumed as an incense in religious ceremonies.

Medicinal uses.—It is used externally in the form of ointment as a rubefacient and stimulant application to boils, carbuncles, etc. It has been occasionally given as an astringent and diaphoretic. Its action, when taken internally, being chiefly directed on the mucous membrane especially of the lungs, it may be given in bronchitis chronic laryngitis and bonchorrhœa.

BRASSICA ALBA.

THE WHITE MUSTARD.

Vern.—*Beng.*—Dhóp-rai; *Hind.*—Sufed-rai; *Pers.*—Sipandáne-sufaid.

The mustard plants are not indigenous to, but are extensively cultivated in many parts of India. Natural order *Cruciferæ*. White mustard when triturated with water does not yield the characteristic essential oil of mustard. It is invariably mixed with black mustard seeds in the preparation of the mustard flour of commerce.

Medicinal uses.—Mustard-flour made into a paste with water is applied to the skin as a stimulant cataplasm or sinapism.

BRASSICA CAMPESTRIS.

THE COLZA AND THE RAPE SEED.

Vern.—*Beng.*—Sarisha; *Hind.*—Sorson; *Sans.*—Sarshap.

This species includes many sub-species, varieties and forms, the most common being the *B.* (*Sinapis*) *dichotoma* (colza), *glauca* (rape), and *Toria*, from the seeds of which is extracted by expression the mustard OILS, which together with the oil of *B. juncea* are universally used in India for culinary and anointing purposes.

BRASSICA JUNCEA.

INDIAN MUSTARD.

Vern.—*Beng.*—Rái-sarishá; *Hind.*—Rái; *Bom.*—Rái.

Cultivated throughout India, forming an important crop in many districts. It yields the mustard OIL so largely prepared in the Presidency Jails by convict labour. The seeds, which closely resemble those of *B. nigra*, contain

about 20 to 25 per cent. of oil. An essential oil is also produced by the action of water as in *B. nigra*.

Medicinal uses.—Mustard Oil is used as an external stimulant application in chest affections especially of children. It is also used for culinary purposes. The whole plant is gathered when in flower, and is considered to possess bitter, aperient and tonic properties.

BRASSICA NIGRA.

The Black Mustard.

Vern.—*Beng.*—Rai-sarisha; *Hind.*—Makra-rai; *Pers.*—Sárshaf.

This is also largely cultivated in India for the fixed Oil which it yields. The seeds yield on distillation the essential Oil of mustard, produced in the presence of water by the *myrosin* of the black mustard.

Medicinal uses.—The powdered Seeds combined with that of white mustard, in the form of mustard-flour, is used as a simple vesicant and rubefacient. Mustard poultices are useful in febrile and inflammatory symptoms. Mustard is often administered as a simple and effective emetic. It is largely used as a digestive condiment.

BRYONIA EPIGŒA.

See Corallocarpus epigœa.

BRYONIA LACINIOSA.

Bryony.

Vern.—*Beng.*—Mala; *Hind.*—Gargú-narú; *Bom.*—Kawale-chedole; *Tel.*—Linga-donda.

This plant (natural order *Cucurbitaceæ*) is common throughout India.

Medicinal uses.—The whole Plant is collected when in fruit. It has bitter, tonic and mild febrifuge properties.

BRYOPHYLLUM CALYCYNUM.

Vern.—*Beng.*—Kop-pátá, Pátarkuchu; *Pers.*—Zakham-haiyat.

A succulent plant with thick fleshy leaves, belonging to the natural order *Crassulaceæ*, common throughout the hot and moist parts of India. The leaves contain tartaric acid.

Medicinal uses.—The LEAVES after being made pliable by holding over a fire are applied to wounds, bruises, and boils, also used in the form of poultice and powder in bad ulcers.

BUCHANANIA LATIFOLIA.

Vern.—*Beng.*—Piál; *Hind.*—Chiraunji; *Sans.* - Piyál; *Tel.*—Chara.

A large tree belonging to the natural order *Anacardiaceæ*, found in most forests of India.

Medicinal uses.—The tree yields a GUM which resembles the Bassora gum, and which is considered efficacious in diarrhœa. The SEEDS called *Chiraunji* or *Chironj* are largely used in the preparation of sweets, and also yield by expression an OIL, which may be used as a substitute for almond oil.

BUTEA FRONDOSA.

BUTEA GUM, BENGAL KINO.

Vern.—*Beng.*—Palás; *Hind.*—Dhák, Palás, Khákhra; *Sans.*—Palása, Kinsuká; *Bom.*—Palása.

This beautiful tree (natural order *Leguminosæ*) is a native of the mountainous districts of India and Burma and common all over Bengal. It is a middle-sized tree and has a most attractive appearance when in flower, the inflorescence being of a bright scarlet colour and capable of yielding a fine yellow dye (*Tesu*) which may

be intensified by boiling with dilute acid. The bark of this tree and that of *B. superba* furnish a very important exudation called the *Palás-gond, Chúniá-gónd* or Bengal *Kino,* very common in the bazárs of India. It has been found very rich in tannic and gallic acids, and is very similar both in chemical properties and medicinal virtue to the official kind (*Pterocarpus marsupium*) q.v. It is more soluble in water than the true *Kino.* The charcoal of the wood of this plant possesses decolorizing properties, which enable it to be used as a substitute for animal charcoal in the purification of alkaloids on account of its comparative freedom from saline matter.

Medicinal uses.—The large flattened SEEDS—Pálas-papra are laxative and anthelmintic. Made into a paste, they are used externally as a remedy for ringworm. The GUM is a most powerful astringent, and is given successfully in many forms of chronic diarrhœa, in 5 to 20 grain doses, with a little cinnamon. Externally it is used as an astringent application.

CÆSALPINIA BONDUCELLA.

THE FEVER NUT: PHYSIC NUT: BONDUC SEEDS.

Vern.—*Beng.*—Náta Karanja, Natár-phal, Kundulí-phal; *Hind.*—Karanju; *Sans.*—Kuberákshí.

A climbing shrub (natural order *Leguminosæ*), common all over Bengal, Bombay, Travancore and the Coromandel coast.

Medicinal uses.—The SEEDS or NUTS are believed to contain antiperiodic properties for which they have been used to a considerable extent in native medicine. Dose 10 to 15 grains. The ROOT-BARK has been found similarly efficacious, and an oil expressed from the leaves is reported to be useful in convulsions, palsy and nervous complaints. The seeds contain an OIL which is used as an embrocation.

CÆSALPINIA SAPPAN.

THE SAPPAN WOOD.

Vern.—*Beng.*—Bakam; *Hind.*—Patang; *Sans.*—Patanga; *Pers.*—Bakam.

The small thorny tree, *Cæsalpina Sappan*, cultivated in Central India, affords the well-known "sappan" of Bengal commerce. The solid, heavy, hard and compact wood, *Bakam*, constituted a very important article of trade in Calcutta before the advent of the aniline dyes, its chief use being as a red dye stuff for cotton fabrics.

Medicinal uses.—It possesses powerful astringent properties and might be substituted in medicine for log-wood. It contains a principle resembling *Hæmateïn*. The active crystalline principle of the *C. Sappan* is said to be identical with *Brasilin*. It has been found by Dr. Warden that the resinous extract of the sappan tree contains a crystalline principle which, fused with potash, yields *Resorcin*.

CALAMUS DRACO.

DRAGON'S BLOOD.

Vern.—*Beng.*—Aprang; *Hind.*—Aprang; *Arab.*—Dam-eth-thuaban; *Bom.*—Hirá-dakhan.

Habitat:—Indian Archipelago; the tree being one of the Rotang or Rattan palms. The resin, which constitutes the valuable blood-red pigment known as "dragon's blood," is contained in the fruits, which are shaken in a sack till it is separated. It is also obtained by boiling the fruits with water. The RESIN thus obtained is melted and made into sticks or run into canes as frequently met with in the bazár. Burned as incense it evolves a most pleasing odour of flowers.

Medicinal uses.—It is occasionally used as an astringent in native medicine. Its more general use is as a colouring agent for plasters and tooth-powders and in the arts for varnish.

CALCII CARBONAS.

CARBONATE OF LIME, CHALK, MARBLE, LIMESTONE.

Vern.—*Beng. and Hind.* Chúná (lime), Chunákalai (slaked lime).

Occurs in one or other of the above forms in every district of India. Lime is also found naturally as "concretionary carbonate of lime"—*Kankar*—on the surface of the ground in many places or in the beds of streams. A large quantity of pure lime is also produced by the calcining of fresh water and marine shells.

Medicinal uses.—As the source of lime water, lime is of considerable importance in medicine and pharmacy.

CALOTROPIS GIGANTEA.

Syn.—ASCLEPIAS GIGANTEA.

MUDAR, SWALLOW-WORT.

Vern.—*Beng.*—Ákanda; *Hind.*—Madár; *Sans.*—Árka, Álarka; *Pers.*—Khark.

The drug consists of the ROOT-BARK of two or more closely allied species of *Calotropis*, (natural order *Asclepiadeæ*,)—*C. gigantea* and *C. procera*. Both these species are extremely common in waste ground, the former in the lower parts of Bengal and Southern India generally, the latter in Northern India. The *C. procera* yields an abundant acrid milky juice which, dried in the sun, constitutes a sort of GUTTA-PERCHA, and has properties almost exactly resembling the real caoutchouc.

Medicinal uses.—The powdered ROOT-BARK and inspissated JUICE are used extensively for their diaphoretic, emetic, alterative and purgative properties, which have been known to the Indian practitioners for many centuries and regarded in some parts as "vegetable mercury." Doses:—Alterative 3 to 10 grains, Emetic 30 to 60 grains. The author has

lately found that a fluid extract of the LEAVES given in doses of one to five drops in intermittent fever, during intermission, generally cuts off the paroxysm more effectually than quinine. Poisonous in large doses. The fresh FLOWERS are also used medicinally. In the dried bark of the root, we have an adequate substitute for ipecacuanah, and when combined with opium a good representative of the official Dover's Powder is prepared. In dysentry, in doses of 5 to 10 grains, it may be safely substituted for ipecac., though double the quantity is generally required. It has been used by native physicians in small doses in leprosy, elephantiasis, secondary syphilis and similar affections. It is also useful in mercurial cachexia and rheumatism.

CAMELLIA THEIFERA.

THE TEA PLANT.

Vern.—*Ind.*—Chhá, Chai.

A native of China (natural order *Ternstræmiaceæ*). The tea plant, as grown in the hill districts of India, constitutes a very large proportion of the tea supply of the world. It is of little interest medicinally except that the dried LEAVES (as well as the seeds of *Coffea arabica*, q. v.) are the source of the crystalline principle—*Caffeine*, also called *Theïne* and *Guaranine*, obtained by sublimation of an extract made by aqueous infusion and evaporation, astringent and colouring matters having been previously removed. It might be very profitably manufactured in India from tea dust. The average yield is 3 to 4 per cent. An infusion of tea SEEDS was lately suggested by Hooper as an remedy for insect blights.

The seeds contain about 30 per cent. of fixed OIL, somewhat resembling olive oil.

Medicinal uses.—Tea is seldom used medicinally *per se*, except as a stimulant in strong infusion or as an astringent

lotion on account of the tannin it contains. *Caffeine* and *Caffeine Citrate* are extensively used in modern practice and are of great value in migraine, hemicrania, neuralgia and similar nervous affections. Like a strong infusion of tea *caffeine* is stimulant, causing wakefulness. It has also diuretic properties. Physiologically the infusion of tea or coffee arrests the molecular change thereby instituting nervous force.

CANANGA ODORATA.

YLANG-YLANG, ILANG-ILANG.

Vern.—*Burm.*—Kadat-ngan.

A large evergreen tree, of the natural order *Anonaceæ*, found in Burma and cultivated in many parts of India for the sake of the OTTO which is obtained from its sweet-smelling flowers. Largely used in perfumery.

CANARIUM COMMUNE.

THE JAVA ALMOND TREE. EAST INDIAN ELEMI.

Vern.—*Beng. and Hind.*—Jangali Bádám; *Mal.*—Kánári.

The plant is a native of the Eastern Archipelago where it is extensively cultivated for the sake of its fruit which has almost the taste of the almond. It is also cultivated in Southern India. Natural order *Amyridaceæ*. The *Elemi* of the *British Pharmacopœia* is generally referred in works on Materia Medica to this tree although the exact botanical source is still undetermined. It is resinous and of a fragrant odour, resembling a combination of lemon and fennel but somewhat terebinthinous. It contains *Bryodin* and an essential OIL. An abundance of limpid oil is obtained from the bark of this tree. The oil has a pungent turpentine smell, congealing to a buttery camphoraceous substance. It cannot be said to resemble the Elemi of the

drug shops. An oil is extracted from the nuts which, in Java, is used in lamps and, when fresh, is mixed with food. *Canarium strictum*, common on the Western side of India, yields a kind of dammar resin (*kala ḍámar*).

Medicinal uses.—Elemi is a mild terebinthinate stimulant; not administered internally. The ointment forms a good application to indolent and ill-conditioned ulcerations.

CANNABIS SATIVA.

Syn.—CANNABIS INDICA.

INDIAN HEMP.

Vern.—*Beng.*—Gánjá, Charas, Siddhí; *Hind.*—Gánjá, Bháng Charas (the resin); *Sans.*—Gánjá, Bhánga, Hursíní; *Arab.*—Kinnab; *Pers.*—Darakte-bang, Darakhte-kinnab.

The hemp plant *Cannabis sativa* (natural order *Cannabineæ*), is a native of Western and Central Asia and now widely distributed and largely cultivated in temperate and tropical countries. The remarkable fact that hemp grown in India is of a very different character to that grown in Europe gave rise to the distinctive name of *Cannabis indica*, a botanical distinction which has now, however, been abandoned. It is largely cultivated all over India and is found wild on the Himálayas and in Kashmír. It is chiefly cultivated in India for the various forms of narcotics which it yields and which have been used so largely by the natives from a very remote period. The hemp plant is sacred to the Hindus. The three principal forms in which the *Cannabis sativa* is used in India are—(1) The *Gánjá, Gunjah*, consisting of the unfertilized resinous flowering shoots of the female plant grown on the plains—in Bengal, the Central Provinces and Bombay. The variation already noted in the character of the plant grown under different conditions

of soil and climate are as marked in plants growing in different parts of India. While the narcotic principle is only developed in the *Gánjá* in the unfertilized flowers it entirely disappears after fertilization has taken place. On the other hand, the plant grown on the lower hills of the Punjab, and which yields (2) *Bháng*, does not develop the narcotic property until the fruits are mature, the dried leaves and fruiting shoots constituting the *Bháng* or *Siddhí* (*sabjí*) which is used so largely by the natives of India and employed in making the intoxicating liquor *Hashish* or the narcotic conserve or confection called *Majúm*. (3) The *Charas* or cannabis RESIN exudes naturally on the leaves, stem and fruits, but only on plants growing on the mountain tracts at an altitude of 6,000 to 8,000 feet. It is powerfully narcotic and is smoked with tobacco. In some parts of India the resin is collected by men in leathern jackets running about among the plants. The *Gánjá*, prepared by treading with the feet into an agglutinated mass, constitutes the *Cannabis sativa* of the *British Pharmacopœia* from which an official extract is prepared. It frequently contains the seeds or fruits, which contain 25 per cent. of fixed OIL, and should be rejected before the hemp is extracted. *Gángá* contains about 20 per cent., *Bháng* 10 per cent., and *Charas* 40 per cent. of resin. This contains the active principle besides fatty matters and chlorophyll. A brown syrupy alkaloid—*Cannabine*—has been isolated and a purified resin called *Cannabinone* is now prepared. Both are employed as sedatives. *Cannabine Tannate* is a yellowish brown powder which is said to be free of some of the toxic properties of *Cannabis indica*.

In the course of his evidence before the Indian Hemp Drugs Commission, held in Calcutta, April 1894, the author showed that *Bháng* and *Gánjá*, while they were used very

extensively by the natives of India to the exclusion of alcohol and other intoxicants, were prescribed by native doctors in bowel complaints and recommended as appetisers, their value as nervous stimulants and as a source of great staying-power under severe exertion, exposure or fatigue being considered important. It was also shown that the effect in moderate use of either of the forms did not last more than a couple of hours and that there were no after-effects. The ultimate finding of the Commission was based on these lines. Indian hemp has somewhat fallen out of favour in European medicine during late years owing to a want of uniformity and consequent uncertainty in its action. This has been partly due, Dr. Watt suggests, to the fact that the restrictions imposed by Government on its cultivation have tended to divert the supplies of the best Bengal *Gánjá* to Bombay, and that the inferior *Gánjá* of Western India has found its way to the London market—the great drug emporium of the world. This is an unfortunate ultimate experience with several valuable Indian drugs, which could be obviated by making Calcutta a general drug depôt where the best samples could be selected and exported to the great drug markets of England and America. Mr. David Hooper has lately* shown that the drug loses its strength through decomposition of the active principles when kept longer than two or three years.

Medicinal uses.—Primarily stimulant; secondarily anodyne, sedative and antispasmodic. Indian hemp has been used to a considerable extent in European medicine, the dried female tops (*Gánjá*) and an alcoholic extract—*Extractum Cannabis Indicæ*—and tincture being official in the *British Pharmacopœia*. It produces a peculiar kind of delirium and that state of the nervous system called catalepsy.

* British Pharmaceutical Conference 1894.

Its valuable anodyne, hypnotic and antispasmodic properties render it specially valuable in allaying pain and relieving spasms. It has been used with much success in tetanus, hydrophobia, delirium tremens, dysmenorrhœa, neuralgia and other nervous affections. It is also useful in hay-fever, asthma, cardiac functional derangement and skin diseases attended with much pain, and pruritus. It has also been used in protracted labours depending upon atony of the uterus with the view of inducing uterine contractions. *Cannabine Tannate* is a useful hypnotic in hysteria and a valuable agent in dysmenorrhœa.

CANSCORA DECUSSATA.

Vern.—*Beng.*—Dánkuni ; *Hind.*– Sankháhuli ;

Sans.—Sankhapushpi.

This little plant, of the natural order *Gentianaceæ*, grows plentifully from the Himálayas to Burma.

Medicinal uses.—It is regarded as laxative, alterative, tonic and is much praised as a nervine. It is used in insanity, epilepsy and nervous debility.

CANTHARIS VESICATORIA.

Cantharides.

Mylabris cichorii (q. v.) is an indigenous substitute for this.

CANTHIUM PARVIFLORUM.

A shrub found in Western India, (natural order *Rubiaceæ*.)

Medicinal uses.—It has been regarded as useful in fever. A decoction of the Leaves and Root is prescribed in certain cases of flux.

CAPPARIS APHYLLA.

THE CAPER BERRY.

Vern.—*Beng.*—Karél ; *Hind.*—Karél ; *Sans.*—Karíra.

This plant grows in the Punjab, North-West Provinces—chiefly in Rajputana—and the Deccan. It belongs to the natural order *Capparideæ*.

Medicinal uses.—The LEAVES of the plant are bruised and said to be used for blistering. It is also used for toothache, giving relief when chewed, and the PLANT is employed as a remedy in boils and skin eruptions. The dried flower-buds and ripe fruit are used as a pickle and largely eaten as such as a condiment in some districts.

CAPPARIS SPINOSA.

THE TRUE CAPER BERRY.

Vern.—*Hind.*—Kabra ; *Sind.*—Kalvari ; *Pers.*—Kebír.

This plant is found chiefly in the northern and central districts of the Punjab and in Sind. It is the source of the European "capers" and the unexpanded flower-buds are pickled and used to a considerable extent as a similar condiment in India. It is not used medicinally, but the condiment made from it is considered beneficial in scurvy. The caper berries have lately been found to contain *myrosin* and a glucoside, the decomposition of which takes place under the influence of the myrosin as certain of the *Cruciferæ*.

CAPSELLA BURSA-PASTORIS.

THE SHEPHERD'S PURSE.

This common weed (natural order *Cruciferæ*), is found very plentifully throughout India especially in the temperate and colder districts.

Medicinal use.—It yields on distillation an essential OIL somewhat similar to oil of mustard which has not, however, been much used medicinally except in America where it is employed as an antiscorbutic.

CAPSICUM ANNUUM.

FRUCTUS CAPSICI.

CAPSICUM, RED PEPPER, CAYENNE PEPPER, POD PEPPER.

Vern.—*Beng.*—Lanka-marich ; *Hind.*—Lál-marich ; *Kash.*—Mirch-wángum ; *Pers.*—Filfile-surkh ; *Sans.*—Marichi-phalam.

Although not originally a native of India this important plant, (natural order *Solanaceæ,*) is very largely cultivated throughout the plains of India and in the hills in some districts. On the Western side it is chiefly cultivated at Goa, and capsicums are known in the Bombay market as Goa Pepper. Seven or eight varieties of capsicum, all yielding pungent FRUITS, are cultivated in India, but the two which yield the bulk of the cayenne pepper of commerce are *C. annuum* and *C. frutescens* (q. v.). The fruits of the *C. annuum* are from ½ to ¾ inch in length—smaller than those of *C. frutescens* which are usually known as long pepper or "chillies." Capsicum owes its pungency and acridity to an OLEO-RESIN called *Capsicin.* Another crystalline substance *Capsaicin* resides in the pericarp. Its vapours are described in *Pharmacographia* as of "the most dreadful acridity, even the ordinary manipulation of the substance requiring much precaution." The capsicum fruits are universally employed in India as a principal ingredient in the manufacture of various curries and chutneys.

Medicinal uses.—Stomachic and stimulant, it is often employed in the form of tincture as an adjunct to tonic and bitter medicines. Capsicum has a powerful action on the mucous membrane and is particularly beneficial in sore throat. It is also employed as a rubefacient liniment.

CAPSICUM FRUTESCENS

CAYENNE PEPPER, CHILLIES, SPUR PEPPER, GOAT PEPPER.

Vern.—*Beng.*—Lál-marich; *Hind.*—Lál or Gách-marich; *Guj.*—Lál-mirchi; *Tam.*—Mullá-ghái; *Tel.*—Mirapa-kaia; *Pers.*—Fifil-i-súrkh.

An annual plant largely cultivated throughout India, chiefly in Bengal, Madras and Orissa, frequently planted by the edges of fields. The bright red FRUITS are the source of much of the cayenne pepper of commerce.

The medicinal uses will be found under *C. annuum*.

CARAPA MOLUCCENSIS.

Vern.—*Beng*—Poshúr.

A tree growing on the coasts of Bengal. The bark possesses bitter and astringent properties and has been employed in diarrhœa, etc.

CARBO LIGNI.

CHARCOAL.

Vern.—*Beng.*—Koyálá; *Hind.*—Kóyelah; *Pers.*—Zughál; *Arab.*—Faham.

A large number of Indian woods are used in the production of charcoal for economic and medicinal purposes. The charcoal of areca nut is used as a tooth-powder.

Medicinal uses.—Wood charcoal is a deodorizer and antiseptic as distinguished from animal charcoal which is a decolorizer. The charcoal of *Butea frondosa* (q.v.) has the property of decolorizing like animal charcoal.

CARDIOSPERMUM HALICACABUM.

Vern.—*Beng.*—Latáphatkarí; *Hind.*—Nayá-phatki; Jyotishmati.

This climbing plant, of the natural order *Sapindaceæ*, is found plentifully in the plains, especially in Bengal.

Medicinal properties.—The Root has been regarded as emetic, laxative, stomachic and rubefacient, used occasionally in rheumatism and nervous diseases.

CAREYA ARBOREA.

Vern.—*Beng.*—Kumbi, Kumbh; *Hind.*—Kumbi, Khumbi.

A tree, named in honour of William Carey, first Missionary to India, belonging to the natural order *Myrtaceæ*. It is found on the Lower Himálaya and in Bengal.

Medicinal uses.—The Bark is astringent and has been used internally as such. It also yields a considerable quantity of a brown-coloured mucilage.

CARICA PAPAYA.

The Papaya or Papaw Tree.

Vern.—*Beng.*—Pepiyá; *Hind.*—Papaya, Papaya amba; *Pers.*—Amba-hindi; *Arab.*—Amba-hindi.

This valuable tree is now one of the commonest objects in gardens all over India. It belongs to the natural order *Passifloreæ* and is a native of America. It has long been domesticated in India and is now specially cultivated for its well known fruit. It may be easily recognised by its plain, straight stem bearing at the summit a tuft of palmately lobed leaves.

The Fruit of the *Papaya* yields the valuable ferment *Papaïn* (papayotin) which has now come to be popularly regarded as vegetable pepsin. It exerts a peculiarly solvent

action upon albumens, but does not form true peptones such as are obtained after digesting proteïds with pepsin or pancreatin. Recent investigations have shown that it is active as a digestive in neutral or weakly alkaline media, and that this action is not stopped in the presence of 0·5 per cent. of hydrochloric acid. Papaïn digestion and the products resulting therefrom are still under investigation, very conflicting statements having been published. Papaïn is precipitated from the FRESH JUICE of the fruit with alcohol, dehydrating the resulting precipitate and extracting with water, preferably at a temperature of 36° to 40° C. The resulting product is dried and powdered and is then ready for use. The colour should be nearly white, but commercial specimens of papaïn vary considerably both in colour and in proteolytic action. The fresh juice of the fruit is even more effectual than the dried preparation, and it is regarded as of great value as a food material. *Carpaine* is an alkaloid which has been isolated from the LEAVES. It has a powerful action on the heart, resembling that of digitalis. The ferment *myrosin* has lately been detected in the leaves. It yields an essential oil in presence of water as in the *Cruciferæ*.

Medicinal uses.—The use of PAPAÏN is indicated in deficiency of the gastric juice, excess of unhealthy mucous in the stomach, in dyspepsia, intestinal irritation, and the like, in doses of 1 to 5 grains. It is most conveniently exhibited in the various forms of compressed tablets. It is used in solution to dissolve the fibrinous membrane in croup or diphtheria, a solution in glycerine being painted on the pharynx every few minutes. It has been applied with good results to ulcers and fissures of the tongue, and in the form of a pigment prepared with borax and water to remove warts and corns and other horny excrescences of the skin.

CARTHAMUS TINCTORIUS.

THE SAFFLOWER, WILD SAFFRON.

Vern.—*Beng.*—Kusamphul; *Bom.*—Kusumba; *Sans.*—Kusumbha.

This plant, natural order *Compositæ*, is cultivated all over India for the valuable dye stuff which it yields. It has been largely superseded by the aniline dyes. The florets yield two distinct yellow dyes and one red known as *Carthamin*. The latter is employed in the manufacture of the well-known *rouge végétale*, the carthamin being mixed with a certain proportion of finely-powdered talc. The florets have been used as an adulterant of saffron.

Medicinal uses.—The SEEDS were formerly regarded as purgative, and an OIL prepared from the plant as useful in rheumatism and paralysis. The safflower is now seldom employed medicinally.

CARUM CARUI.

THE CARAWAY.

Vern.—*Beng.*—Jira; *Hind.*—Shiá-jira; *Arab.*—Karawya; *Pers.*—Karóya.

Natural order *Umbelliferæ*. The Caraway is cultivated for its FRUIT in many parts of the plains of India. It has long been a favourite spice both in Europe and India. A valuable essential OIL is distilled from the seeds which is used in medicine and in perfumery. The oil consists essentially of two principles which have been named respectively *Carvene* and *Carvol*.

Medicinal uses.—The SEEDS are employed as a carminative aromatic stimulant in conjunction with other medicines in flatulence, colic and the like, and the oil is used for the same purposes.

CARUM COPTICUM.

Syn.—Carum ajowan, Ammi copticum, Ptychotis coptica.

Lgiusticum ajwain.

Bishop's Weed.

Vern.—*Beng.*—Jowan; *Hind.*—Ajowan; *Sans.*—Yamani; *Bom.*—Ajwán.

This plant, one of the numerous essential oil-yielding *Umbelliferæ*, is largely cultivated in Eastern India. It is a source of the valuable antiseptic *Thymol*, a stearoptene which is contained in the oil yielded by its Seeds, sometimes to the extent of 20 or 30 per cent. It is identical with that obtained from *Thymus vulgaris*. This crystalline substance is well known in the bazárs of India as *Ajwain-ke-phul* and a distilled water from the seeds—*Omum* water or *Ajwain-ka-arrack*—also contains it as an active principle.

Medicinal uses.—The Seeds themselves and *Omum* water are largely used by the natives of India as a carminative in flatulence, dyspepsia and spasmodic affections. *Ajwain-ke-phul* is used in small doses for the same purposes and in cholera to some extent. Applied externally in alcoholic solution it is useful in allaying nervous pains. Thymol has not taken the prominent place in European surgery it was expected to do. The Oil distilled from the seeds is also used medicinally for the purposes indicated above.

CARYOPHYLLUS AROMATICUS.

Syn.—Eugenia caryophyllata.

Cloves.

Vern.—*Beng.*—Lavanga *Hind.*—Lavanga; *Sans.*—Lavanga; *Bom.*—Lavang.

The tree, *Caryophyllus aromaticus* (natural order *Myrtaceæ*), is a native of New Guinea, Amboyna, and the

Moluccas. It is now cultivated to a considerable extent in Southern India, although the trade in cloves has not yet attained to any importance. The unexpanded FLOWERS of this tree are the cloves of commerce. In India these are used both as a condiment and a masticatory. The flower-buds and flower-stalks yield when distilled with water a volatile OIL possessing in a powerful degree the odour and flavour of cloves. The yield is sometimes as much as 16 or 20 per cent. Clove oil yields as an oxidation product or phenol *Eugenol* or *Eugenic Acid*, a powerful antiseptic several times stronger than carbolic acid.

Medicinal uses.—Cloves are aromatic, stimulant and carminative. They are given to correct flatulence and aid digestion, but chiefly as an adjunct to bitter tonics or as a corrector of purgatives. The volatile oil *Lavangatel* is also much used by perfumers, and dentists apply to carious teeth to cauterize the exposed nerve. It is also used in combination with other oils of the same class as a stimulating embrocation. The powder, tincture, infusion and oil are the various forms in which cloves are use .

CASSIA ALATA.

Vern.—*Beng.*—Dádmardan ; *Hind.*—Dádmurdan ; *Sans.*—Dadrughna.

The leaves of *Cassia alata*, of the natural order *Leguminosæ*, which grows wild and is cultivated all over Bengal and in many other parts of India.

Medicinal uses.—One of the native names of this plant is derived from its efficacy in curing ringworm. The FRESH LEAVES when bruised and mixed with lime-juice act with decided efficacy in this and similar skin affections.

CASSIA ANGUSTIFOLIA.

Syn.—C. LANCEOLATA.

INDIAN OR TINNEVELLY SENNA.

Vern.—*Beng.*—Sona-mukhi; *Hind.*—Sana; *Arab.*—Sana-e-Hindí.

This plant (natural order *Leguminosæ*), is largely cultivated in Southern India, at Tinnevelly and in the Bombay Presidency. It yields the Tinnevelly Senna of commerce which is largely exported from Bombay. Indian Senna, as met with in the bazárs, is of very inferior quality.

Medicinal uses.—The properties of senna are well known. The LEAVES contain a glucoside or cathartic principle called *Cathartic Acid.* They have long been extensively used as a simple purgative, although they present a decided tendency to griping, which may be overcome, however, by aromatics. The LEGUMES—Senna Pods—have mild purgative properties and have less tendency to griping.

CASSIA FISTULA.

Syn.—CATHARTOCARPUS FISTULA.

INDIAN LABURNUM.

Vern.—*Beng.*—Sondál, Sundálí; *Hind.*—Amaltás; *Sans.*—Suvarnaka.

Cassia fistula is indigenous to and common throughout India and Burmah. "The tree is uncommonly beautiful when in flower, few surpassing it in the elegance of its long pendulous racemes of large bright yellow flowers, intermixed with the young lively green foliage." The well known brown pendulous PODS, 1 to 1½ foot in length, are used in medicine.

Medicinal uses.—The PULP of the fruit is an agreeable mild laxative. It is best used combined with other purgatives as a confection or electuary, as by itself it requires to be taken in doses of from one to two ounces to produce any effect. It is official in the *British Pharmacopœia* as an ingredient in confection of senna. The ROOT-BARK is also laxative and the powdered SEEDS and LEAVES are possessed of similar properties, but they are seldom employed.

CASSIA OBOVATA.

COUNTRY OR JUNGLE SENNA.

Vern.—*Beng.*—Sonamukhi; *Hind.*—Sonapát.

This species of *Cassia*, said to have been the first known to botanists, is plentiful on the Coromandel coasts and in Mysore. The LEAVES are sold in the bazárs as country senna. It is said to have been cultivated as an adulterant of Alexandrian Senna, but this has been discontinued. It is seldom used medicinally by the natives.

CASSIA OCCIDENTALIS.

THE NEGRO COFFEE.

Vern.—*Beng.*—Kálkáshundá; *Hind.*—Kásundá

A common weed distributed from the Himálaya to Ceylon. The SEEDS roasted and ground have been used as a substitute for coffee. The medicinal properties are destroyed in the roasting process.

Medicinal uses.—The LEAVES, ROOTS and SEEDS are purgative. Externally the seeds are used in cutaneous diseases.

CASSIA SOPHORA.

Syn.—Senna sophora.

Vern.—*Beng.*—Kál-kásundá; *Hind.*—Kásundá; *Sans.*—Kásamarda.

This plant is common throughout the tropics and well known in India.

Medicinal uses.—The Leaves and Seeds are employed in curing skin diseases, being regarded as a specific in ringworm, especially in the form of a paste mixed with sandalwood oil. The seeds with equal parts of sulphur rubbed into a paste with water are applied with good effect to patches of pytyriasis and psoriasis. This virtue would seem to lie in the *Chrysophanic Acid* which it and other species of *Cassia* (*C. alata, C. occidentalis* and *C. tora*) contain. Expectorant properties have been attributed to the plant probably from the fact that the Sanskrit name means "destroyer of cough."

CASSIA TORA.

The Fœtid Cassia.

Vern.—*Beng.*—Chakundá; *Hind.*—Chakund; *Sans.*—Chakramarda.

This plant is quite common in Bengal and the Central Provinces of India. Its Leaves and Seeds contain *Chrysophanic Acid* to which is probably due their medicinal value in the treatment of skin diseases.

Medicinal uses.—As a remedy in ringworm and scabies. The Leaves are also used by some Hindu practitioners in the form of a paste with lime juice for ringworm. The seeds have been used as an admixture and substitute for coffee. It is known under the name of *Cassophy*, but has no nerve-exciting properties.

CATECHU.

See ACACIA CATECHU and ARECA CATECHU.

CEDRUS DEODARA.

Syn.—PINUS DEODARA.

THE DEODAR, HIMALAYAN CEDAR.

Vern.—*Hind.*—Deodár, Kelu; *Sans.*—Devadáru.

This tall and graceful tree (natural order *Coniferæ*), is found all over the Northern Himálaya and is largely cultivated in India as an ornamental tree.

Medicinal and uses.—The wood yields an OLEO-RESIN known as *Kelu-ka-tel*, and a dark-coloured OIL or tar resembling crude turpentine is obtained by destructive distillation. These are applied to ulcers and skin diseases. Valuable in mange in horses and sore feet of cattle. The LEAVES are also regarded as having mild terebinthinate properties. The WOOD is carminative.

CELASTRUS PANICULATA.

Vern.—*Beng. and Hind.*—Malkángni.

This is a shrub which is common on the Himálaya and in Behar, Bengal and Burma, natural order *Celastrineæ*. It yields a black empyreumatic oil, obtained from the SEEDS by destructive distillation.

Other ingredients are mixed with this oil to form what is known as the *oleum nigrum*, which is black, viscid, with a smoky and aromatic odour, slightly bitter and acrid taste.

Medicinal uses.—The OIL is a diuretic and diaphoretic in doses of from ten to thirty minims. It is the best remedy for *beri-beri*—an epidemic disease peculiar to India. It is also a powerful stimulant.

CEPHAËLIS IPECACUANHA.

IPECACUANHA ROOT.

The *Ipecacuanha* (natural order *Rubiaceæ*), is a native of Brazil. Its experimental cultivation has been promoted by the Government of India for about twenty years with little success so that it is not likely to become a crop of any importance to Indian cultivators. The Government of India was originally induced to encourage its introduction by the increasing importance of the drug as a remedy for dysentery and a probable scarcity in supplies. The latter difficulty has not, however, been realised, the Brazilian supplies being constant and plentiful. There are one or two species indigenous to the Moluccas, and the root has been exported from Singapore, but it is not of good quality.

Medicinal uses.—Ipecacuanha is most extensively used in modern medicine, in small doses as an expectorant and diaphoretic, and in large doses as an emetic. In doses of 30 to 40 grains it may be regarded as a specific in dysentery, and is largely used in India for this purpose either alone or combined with opium. The *cortical* portion of the ROOT contains *Emetine*, a mixture of alkaloids, (about 2·5 per cent) and *Ipecacuanhic Acid*, to the former of which the emetic property is due. The latest researches (Paul and Cownley) have shown Emetine to be composed of two principal alkaloids now named *Emetine* and *Cephaëline*, both of which have emetic properties. A "Hydrochlorate of Emetine" is now prepared. Little is known of the particular constituent of Ipecacuanha to which its anti-dysenteric action is due, some having attributed it to *Ipecacuanha-tannic Acid*. It has been found that as a remedy for dysentery it is equally efficacious *siné* emetine (the tendency to nausea and depression being avoided)

and a "de-ëmetinized ipecacuanha," originally prepared by Messrs. Symes of Simla at the suggestion of Surgeon-Major Harris of that station, is now extensively employed. The result of analyses of the unofficial parts of the ipecacuanha plant show that both stem and leaves contain emetine.

CEPHALANDRA INDICA.

Syn.—COCCINIA INDICA.

Vern.—*Beng.*—Telá-Kucha; *Hind.*—Kandurí-kí-bel; *Sans.*—Bimba; *Pers.*—Kabare-hindi.

A plant, belonging to the natural order *Cucurbitaceæ*, common throughout India.

Medicinal uses.—The juice of the ROOT is useful in diabetes. The LEAVES are used in skin diseases.

CERA ALBA and CERA FLAVA.

WAX.

Vern.—*Beng.*—Móm; *Hind.*—Móm; *Sans.*—Madhujam.

Wax is collected all over India as the product of wild and domesticated bees—*Apis mellifica* and other species. The honeycombs are usually deposited on shrubs or trees, these being leased out in certain districts to collectors who extract the honey and prepare the yellow wax, usually in a somewhat impure state, for the market. The yellow wax cut into fine shreds, bleached in the sun and re-melted, constitutes white wax. Bee culture is encouraged in a primitive fashion in certain parts of Bengal, but it might be considerably extended, and much of the wax annually consumed in India produced in the country instead of being imported.

Medicinal uses.—The principal use of bees' wax in medicine and pharmacy is in the preparation of ointments.

CHAULMUGRA.

See GYNOCARDIA ODORATA.

CHENOPODIUM AMBROSIOIDES and C. BOTRYS.

JERUSALEM OAK.

These plants, belonging to the natural order *Chenopodiaceæ*, are found in many parts of India and are held in some repute for their anthelmintic properties, administered in the form of infusion. An essential OIL is also prepared from them which is regarded as tonic and antispasmodic and is useful in nervous affections. *C. album* (Beng. *Bathu-sag*) is used as a laxative in spleen and bilious disorders.

CHIRATÆ HERBA.

See SWERTIA CHIRATA.

CHRYSANTHEMUM CORONARIUM.

THE CHRYSANTHEMUM.

Vern.—*Beng.*—Gul-daudi; *Hind.*—Gal-dáudi.

This and one or two other species of the familiar garden plant (natural order *Compositæ*), are found in Bengal, chiefly acclimatised.

Medicinal uses.—This plant was included in the *Pharmacopœia of India* with the suggestion that the FLOWERS might be used as a substitute for those of chamomile, while the ROOT resembled that of pellitory, in so far as it presented the same tingling sensation to the tongue when chewed.

CICHORIUM INTYBUS.

CHICORY.

Vern.—*Hind.*—Kasni; *Pers.*—Kasni.

This perennial herb (natural order *Compositæ*), grows wild in the Punjab, Kashmír and North-West India. Chicory has for about a century been associated with coffee as an adjunct and flavouring agent and not unfrequently as a substitute for it. For this purpose the ROOTS are dried, roasted and ground. It might easily be cultivated extensively and profitably in India. Chicory contains no caffeine.

Medicinal uses.—The ROOT is used in native medicine as a bitter tonic and carminative, occasionally as a substitute for taraxacum in liver congestion.

CIMICIFUGA FŒTIDA.

See ACTEA SPICATA.

CINCHONÆ CORTEX.

CINCHONA BARK, PERUVIAN BARK, JESUIT'S BARK.

Vern.—*Beng.*—Cinchona.

The most important species of cinchona (natural order *Rubiaceæ:* tribe *Cinchoneæ*), indigenous to tropical South America, are now thoroughly acclimatized in India. The history of its introduction into India is an interesting study, and the literature on this subject alone is quite voluminous, while its propagation and cultivation, encouraged with a liberality beyond all precedent by the Government of India, has been so eminently successful that the cinchona is now to be regarded as one of the most impor-

tant medicinal plants grown in the Peninsula. While primarily designed to supply quinine at a lower price than the almost prohibitive rates which prevailed about thirty years ago (due to the fact that the South American forests were being rapidly destroyed as the trees were felled for their bark), and in view of the extremely valuable nature of the cinchona alkaloids especially in the malarial districts of India, the extensive Government plantations have produced a revolution in the cultivation of cinchona which will be historical. Among names which will ever be associated with the introduction of this valuable plant into India are those of Mr. Clements R. Markham, C.B., the lately deceased Mr. Richard Spruce and his *collaborateur* Mr. Cross, and more recently Mr. M. A. Lawson, Madras, and Dr. George King, Superintendent of the Royal Botanic Gardens, Calcutta, who has given much practical advice on the subject to the Government of India and to private planters, while his *Manual of Cinchona Cultivation in India* is a valuable compendium of the whole subject. To the late Mr. W. G. MacIvor, formerly Superintendent of the Government Gardens at Ootacamund, is due, however, in large measure the credit of the remarkable success which has attended the cultivation of cinchona in India. To him the first consignments of seeds and plants sent from Kew and brought from Java and from South America were handed over and tended with a care and patience that was only rewarded by the fruitful result of his labours that has been already indicated. In the course of his experiments Mr. MacIvor made the valuable discovery of the process now known as "mossing" whereby trees were made to yield second growths of bark which in India are found in some species to excel in alkaloidal value the natural or original bark, thus ensuring a produc-

tiveness that had not hitherto been dreamt of even in Bolivia or Peru. Mr. David Hooper, Government Quinologist at Ootacamund, Madras, has made extensive researches into the respective alkaloidal values of the numerous species of cinchona grown in India, from which he has found that the yield is, as a rule, richer than corresponding plants of South American origin.

Cinchona is exported chiefly from private concerns in Madras, Southern India and Ceylon, although the competition and low prices of late years have caused planters in the latter island to uproot the trees in many places. In the Rangbí valley, in Sikkim, near Darjíling, the extensive Government plantations contain about five million cinchona plants, the bark produced here, and at the Nilgiri plantations, being mostly employed, however, in the manufacture of sulphate of quinine and of the

GOVERNMENT CINCHONA FEBRIFUGE,

a popular substitute for quinine, the distribution and sale of which is extensively promoted by Government. It is obtainable at all the European and native drug shops. It represents the total alkaloids in the bark extracted by a simple oil process, based on the solubility of these alkaloids in a mixture of fusel and kerosine oils. The powdered bark is mixed with caustic soda, or caustic lime and water, and the oils, the mixture being agitated for some hours and the alkaloids subsequently extracted from the oil by means of muriatic acid. Caustic soda precipitates the total alkaloids, which are then washed and dried. The powder as sold is of a yellowish colour, unlike *Quinetum* of English manufacture, which also represents the total alkaloids, this being probably intended to prevent its being substituted for sulphate of quinine. The author has found it to act quite

as surely as quinine, but larger doses are required, and they often cause nausea and vomiting. It is best administered in the form of pills. Given in water each grain requires two drops of lemon juice to dissolve it: the mixture is not clear, some resinous matter floating on the top. With this addition of lemon juice it is more acceptable to the stomach. In order to bring it within the reach of the very poorest of the population, Government-manufactured quinine is now put up for sale in *pice* packets in the Bengal and Madras Presidencies.

Appended are brief details of the Pharmacopœial barks as grown in India with one or two of the most important of the unofficial species. The cultivated barks do not always correspond to official characters.

CINCHONA CALISAYA.

Cinchonæ Flavæ Cortex.

Yellow Cinchona Bark (off.)

This species grows best in India at the Himálayan plantations where it is cultivated almost exclusively. It gives a good yield of alkaloids of which quinine is usually about a half. The bark of *C. Ledgeriana*, a cultivated variety, is also regarded as yellow bark.

CINCHONA OFFICINALIS.

Cinchonæ Pallidæ Cortex.

Pale Cinchona Bark (off.)

This is chiefly cultivated on the Nilgiris, near Ootacamund, Madras, in Southern India and Ceylon, and it is largely exported. It yields the crown bark of commerce.

CINCHONA SUCCIRUBRA.

CINCHONÆ RUBRÆ CORTEX.

RED CINCHONA BARK (OFF.)

The tree yielding the red bark of commerce grows well both in Bengal (in Sikkim) and in the Madras Presidency. It has proved to be the hardiest and most easily cultivated. The yield of alkaloids is now richer than that from South American barks. As is well-known the red bark is used exclusively for official pharmaceutical preparations. Among other cinchonas cultivated in India are *C. angustifolia, C. micrantha, C. pitayensis, C. nitida,* and numerous hybrids, some of which give an alkaloidal yield superior to the original species.

Medicinal uses.—These are well-known. The BARK and all preparations of cinchona are powerfully antiperiodic, specially valuable in intermittent fevers. They are most extensively prescribed as tonics. The alkaloids are similarly valuable as antipyretics, *Quinine* being the most important, and having been found the most efficacious in India, the other important alkaloids in the order of their medicinal value in Indian fevers being *Quinidine, Cinchonidine,* and *Cinchonine.*

CINNAMOMUM GLANDULIFERUM.

Syn.—LAURUS GLANDULIFERA.

NEPAL CAMPHOR WOOD: NEPAL SASSAFRAS.

Vern.—*Nepal.*—Malligiri; *Assam.*—Gunserai.

This large tree, natural order *Laurineæ,* is a native of Nepal and Eastern India extending to Assam and Sylhet.

The essential OIL contained in the wood resembles to some extent that of *Cinnamomum Camphora.* This tree is not a source of camphor to any important extent. The wood may be regarded as a substitute for Sassafras. (See also *Blumea lacera.*)

CINNAMOMUM TAMALA.

CASSIA LIGNEA : CASSIA.

Vern.—*Beng.*—(The Leaves)—Tejpat. (The Bark)—Dalchini; *Hind.*—Taj-kalam (bark), Tajpat (leaves); *Sans.*—Tejpatra.

The tree *Cinnamomum Tamala,* natural order *Laurineæ,* is common on the Himálayas and in Eastern Bengal and Burma. The BARK has an aromatic agreeable odour, similar, and the finer qualities not much inferior to, the true cinnamon—*C. zeylanicum.* It yields an essential OIL similarly resembling that of Ceylon cinnamon. An oil is also distilled from the LEAVES.

Medicinal uses.—The BARK possesses aromatic, carminative, and stimulating properties. It is commonly used as a substitute for the more expensive cinnamon. The LEAVES have similar properties, and are largely used as a condiment.

CINNAMOMUM ZEYLANICUM.

CINNAMON.

Vern.—*Beng.* and *Hind.*—Dalchini; *Sans.*—Gudatvak.

The true cinnamon is indigenous to Ceylon and Southern India, but it is cultivated only in Ceylon. The fine inner BARK is prepared into quills or sticks of about $\frac{3}{8}$ inch in diameter, each containing a number of smaller quills.

It is easily distinguished in this form from cassia bark which is often substituted for it, and which is usually in single quills and much thicker and darker in colour.

An important essential OIL is distilled from the bark. The leaves yield a darker coloured oil (*Oleum Cinnamomi Foliorum*) which has an odour resembling that of cloves and cinnamon, containing as it does a large proportion of *eugenol*, one of the constituents of that product. It usually contains 70 to 80 per cent. of eugenol, the remainder being cinnamic aldehyde.

Medicinal uses.—It is a grateful aromatic, largely employed as an adjunct to other medicines as a cordial and stimulant. It is also very largely used as a spice.

CISSAMPELOS PAREIRA.

FALSE PAREIRA BRAVA.

Vern.—*Beng.*—Nimuká; *Hind.*—Akanádi, Nirbisi; *Sans.*—Ambashtháí.

This plant, natural order *Menispermaceæ*, is common nearly all over India. The root constitutes the False Pareira Brava of commerce. The distinguishing features between this and the true Pareira Brava as derived from *Chondodendron tomentosum* are described in all works on *Materia Medica*.

Medicinal uses.—The dried ROOT was formerly much prescribed, usually in the form of decoction or liquid extract, as a diuretic or in chronic catarrhal affections of the bladder and in calculus. It has been found useful in advanced stages of acute and chronic cystitis. The LEAVES are used in India as an external application to sores and abscesses.

CITRULLUS COLOCYNTHIS.

COLOCYNTH : BITTER APPLE.

Vern.—*Beng.*—Indráyan, Mákál ; *Hind.*—Indráyan ; *Sans.*—Indra váruni: *Bom.*—Indra-yan;

The colocynth gourd is found wild in the arid tracts of the North-West, in the Punjáb and Sind, and on the Coromandel Coast. It belongs to the natural order *Cucurbitaceæ*. The drug consists of the internal pulp of the dried peeled FRUIT, the seeds having been removed. It has an intensely bitter taste, and is poisonous in excessive doses. The active principle is a glucoside, *Colocynthin*.

Medicinal uses.—Its cathartic properties are well-known. It is usually combined with other drugs to counteract its griping tendencies. The powder is often used as an insecticide.

Substitutes.—The fruits of *Cucumis trigonus ; C. pseudo-colocynthis*, and *C. Hardwickii*, plants growing abundantly in the mountainous regions of Northern India, Bengal, and the Punjáb are frequently found in the bazárs, and occasionally used to adulterate colocynth. They are distinguished from the round fruits of the true drug by their smaller size and different shape, the first being somewhat triangular, and the second of the size and shape of a small hen's egg.

CITRULLUS VULGARIS.

THE WATER MELON.

Vern.—*Beng.*—Tarmuj ; *Hind.*—Tarbuza ; *Bom.*—Kalinga.

This favourite fruit is very largely cultivated in India, especially in the colder regions. The SEEDS of this and other *Cucurbitaceous* plants are used to some extent by the natives as a cooling and diuretic medicine. The juice is fermented and used as a spirituous liquor.

CITRUS AURANTIUM.

VAR.—AURANTIUM PROPER.

THE SWEET ORANGE.

Vern.—*Beng.*—Kamala nebu ; *Hind.*—Nárangi ; *Sans.*—Nágranga,

and CITRUS AURANTIUM.

VAR.—BIGARADIA.

THE BITTER OR SEVILLE ORANGE.

Several of the important members of the genus *Citrus*, natural order *Rutaceæ*, yielding valuable essential oil-bearing fruits, have long been extensively cultivated in India.

The orange tree, *C. Aurantium*, supposed to be the origin of the cultivated orange, sweet or bitter, is believed by some authors as originally a Native of Northern India.

Different varieties of the sweet orange are grown all over India, chiefly throughout the warmer moist regions. The bitter orange is not so largely cultivated. Bitter Orange PEEL (*Aurantii Cortex*) and Bitter Orange FRUIT (*Aurantii Fructus*) are official in the *British Pharmacopœia*. Orange FLOWER Water (*Aqua Aurantii Floris*) is directed to be distilled from the flowers of both. It is usually produced in the manufacture of Oil of Neroli (*Oleum Aurantii Florum*), the water passing over with this OTTO during distillation of the fresh flowers. The finest quality is that distilled from the petals only of the bitter orange. It is not produced in India, but is very popular in native perfumery and could be manufactured in a pure state with advantage. An artificial oil of neroli is now prepared. *Essence de Petit Grain* was formerly distilled from the seeds, but is now produced

from the leaves and small twigs, yielding a commoner oil which is used to adulterate the oil of neroli. Essential Oil of orange peel is made from the fresh fruit, that of the bitter being the more valuable.

Medicinal uses.—The dried orange peel or Rind is stomachic and tonic, and used as such in the form of tincture and infusion, as an adjunct to other medicines. Syrup of orange flower and orange flower water are very frequently used in pharmacy as pleasant flavouring agents.

CITRUS MEDICA.

Var.—Medica proper.

The Citron : Cedrat.

Vern.—*Beng.*—Bara nembu ; *Hind.*—Limbu-turanj ; *Sans.*—Begapúrá.

The citron, the lemon and the limes are now usually classed as varieties of the species *Citrus medica* (Linn.) The citron is largely cultivated in India, and is found wild in the forests of Assam, Northern India, in Kumaon and Sikkim, of which region, it is believed, to have been originally a native. The fruit yields a valuable essential Oil (*Oleum Cedrat.*) It is not used medicinally.

CITRUS MEDICA.

Var.—Limonum.

The Lemon.

Vern.—*Beng.*—Gonrá nembu ; *Hind.*—Jámbira ; *Sans.*—Mahájámbira ; *Arab.*—Qalambak.

The lemon is cultivated with much success in Northern India chiefly for its Fruit; the essential Oil (*Oleum*

Limonis, B. P.), not being manufactured, although it might form a valuable additional article of commerce.

Cortex Limonis of the *Pharmacopœia* is the outer part of the rind or pericarp of the *fresh* fruit. *Succus Limonis*, the freshly expressed juice of the ripe fruit, is also official. With lime juice, it is the source of citric acid; the amount yielded by the Indian fruits being, however, smaller than in the varieties cultivated in Europe.

Medicinal uses.—The OIL, tincture and syrup prepared from the lemon PEEL are largely used in pharmacy as flavouring agents. LEMON JUICE is highly valued as an antiscorbutic, and is given in rheumatism. It is largely used in the preparation of cooling beverages and effervescing draughts.

CITRUS MEDICA.

VAR.—ACIDA.

THE LIME TREE.

Vern.—*Beng.*—Páti nembu, Kagzi nembu; *Hind.*—Kagzi.

Several varieties of the lime, known as *páti nembu*, *kagzi nembu*, and others are indigenous to the Himálayas, and largely cultivated in Upper India and Bengal. The JUICE of the FRUIT, commonly known as LIME JUICE, has properties similar to those of lemon juice, and is largely used as a cooling beverage. A preparation of lime juice preserved without the aid of alcohol, introduced by Preo Lall Dey, F.C.S., son of the author, is popular in Calcutta, and has attained a wide reputation in India as an antiscorbutic for general use and for Mahomedan seamen, Indian emigrants and others whose religious tenets forbid the use of alcohol in any form.

CLAVICEPS PURPUREA.

THE ERGOT.

The rust of wheat and other crops in India has been found to possess properties similar to those of the true ergot. It is not, however, used medicinally by the Natives of this country.

CLEOME VISCOSA.

Syn.—POLANASIA ICOSANDRA.

WILD MUSTARD.

Vern.—*Beng.*—Húr-húria; *Hind.*—Jangli húr-húr.

A common weed, belonging to the natural order *Capparideæ*, found all over India and plentifully in Bengal. It has properties resembling those of mustard for which it is sometimes regarded as an efficient substitute. The seeds are known in the bazár as *churi-ajwan*.

Medicinal uses.—The fresh juice of the LEAVES is in great repute among the Natives as a remedy for earache, being dropped into the ear. It is also applied externally as a rubefacient and vesicant. The SEEDS are stimulant, carminative and anthelmintic. They yield on expression a fixed OIL.

CLERODENDRON INFORTUNATUM.

Vern.—*Beng.*—Bhánt; Ghentú; *Hind.*—Bhánt; *Sans.*—Bhándíra.

The *Clerodendron infortunatum* is a wild plant common all over Bengal, in Malabar, and the S. Concans. It belongs to the natural order *Verbenaceæ*.

Medicinal uses.—The fresh juice of the LEAVES is used as a vermifuge, and also as a bitter tonic and febrifuge in malarial fevers, especially in those of children. The ROOT of this plant in 10 to 15 grain doses made into a paste with water has been found of great value in hæmorrhoidal disturbance. It readily relieves congestion and torpidity of the bowel and acts as a slight aperient.

CLITORIA TERNATEA.

Beng.—Aprájita; *Hind.*—Aprájit; *Sans.*—Aparájitá.

A very common plant, belonging to the natural order *Leguminosæ*, found all over India and cultivated in flower gardens.

Medicinal uses.—An alcoholic extract of the ROOT has been used as a cathartic in doses of 5 to 10 grains, and the SEEDS as a mild purgative, the latter being sometimes combined in powder with cream of tartar and ginger. They have been confused with those of *Ipomœa hederacea* the *kalá-dána* (q. v.)

COCCINIA INDICA.

See CEPHALANDRA INDICA.

COCCULUS CORDIFOLIUS.

See TINOSPORA CORDIFOLIA.

COCCULUS INDICUS.

See ANAMIRTA COCCULUS.

COCCULUS VILLOSUS.

Vern.—*Hind.*—Jamti-kí-bel; *Sans.*—Vanatíktika.

A climbing plant, of the natural order *Menispermaceæ*, found in Bengal, the Punjáb and Sind.

Medicinal uses.—The ROOTS are bitter and tonic, sometimes administered in decoction for rheumatism. The juice of the LEAVES has the property when mixed with water of coagulating into a jelly-like substance which is used as a demulcent.

COCCUS CACTI.

THE COCHINEAL INSECT.

Vern.—*Beng.*—Kírmdana, Kiranda.

Coccus cacti is an *Hemipterous* INSECT, chiefly used in pharmacy in the dried state as a colouring ingredient, when it constitutes cochineal. Carmine is a brilliant red colouring matter also prepared from *Coccus cacti*. It is a valuable staining agent in histological work. Several attempts have been made to introduce the cultivation of the insect into India, at Rajputana, and other places, not without success, several species of *Coccus* and the *Cactus* or *Opuntia* plants on which they feed being already acclimatized. It would form a most important article of commerce. The colouring principle of cochineal is *Carminic Acid*.

Medicinal uses.—Cochineal has been supposed to possess anodyne and antispasmodic properties for which it is occasionally used in pertussis. The tincture is the official preparation.

COCCUS LACCA.

LAC.

Vern.—*Beng.*—Gálá ; *Hind.*—Lákh ; *Sans.*—Lákshá.

The important article of commerce known as "lac" is obtained from incrustations on the branches of various trees, chiefly *Schleichera trijuga* (*Kusumb*), *Butea frondosa*, *Erythrina indica*, and several species of *Ficus*—produced by the lac insect *Coccus lacca*, which punctures the bark. The resinous incrustation is formed only by the female insect, and the portions of branches so covered are termed "stick-lac." These are treated with water, which separates the lac from the twigs and reduces it to the form of small grains in which form it is known as "seed-lac," while the residual liquid is evaporated down to produce the lac-dye of commerce. "Shell-lac" is produced by heating the seed-lac, and straining while liquid on to the surface of plantain leaves, the glossy nature of the leaf producing the scale-like form in which it is well-known. Shell-lac is used in Hindú medicine in the preparation of several medicinal oils *Lákshádi taila*, *Angáraka taila*, etc., probably as a colouring agent. Its more important uses are in the arts.

COCOS NUCIFERA.

THE COCOANUT PALM.

Vern.—*Beng.*—Nárikel ; *Hind.*—Náriyel ; *Sans.*—Nari-kela.

This graceful palm, natural order *Palmæ*, is extensively cultivated in Southern India and Ceylon. It is not found in the Upper Provinces of Hindústan, but is plentiful in Eastern Bengal, in Southern India and Burma towards the Sea Coast, in Malabar and Coromandel, and the Islands of

the Indian Archipelago. The whole tree is of great economic value to the people of the seaboard districts of India, almost every part being utilized. The juice extracted from the flowering spikes is made into a palm wine or toddy. From the unfermented juice a coarse sugar is prepared somewhat different from cane-sugar. The kernel of the fruit is eaten, and it yields on expression or boiling with water the COCOANUT OIL (*nariyal-ká-tél*) of commerce, which in the pure state is a solid substance of the consistence of lard at a temperature below 69°F. and fluid at 74°F. Its specific gravity has been found by the author to average ·9288. It is soluble in alcohol and ether. Cocoanut oil is largely used as an emollient and for toilet purposes, as an illuminant and in the manufacture of soap. The fibrous husk of the fruit, known as *coir* fibre, is one of the important products yielded by this tree.

Medicinal uses.—The fresh watery JUICE or MILK of the well-known fruit is diuretic, antacid and refrigerant, and is extensively used for allaying gastric irritation; the ROOT has also been used as a diuretic. The OIL constitutes the basis of many of the medicinal oils of the *Kobirajs*, being readily absorbed by the skin. Given internally it is nourishing in wasting diseases of children, being largely used for this purpose in some American hospitals.

COFFEA ARABICA.

COFFEE.

Vern.—*Beng.*—Coffee; *Hind.*—Káfi, Kawa, Bun; *Bom.*—Caffi; *Arab.*—Kahwa.

The *Coffea arabica* and several other species of the plant, natural order *Rubiaceæ*, are cultivated in Southern India, a very large proportion of the coffee used all over

the world being the production of India and Ceylon. The dried SEEDS, "coffee beans," yield the crystalline principle *Caffeine*, which is identical with the *Theine* contained in tea—(*Camellia theifera*), q. v. Caffeine is also contained in the Kola nut (*Cola acuminata*), q. v. It is allied to *Theobromine* of *Theobroma Cacao*. Coffee LEAVES have also been found to contain caffeine, and have been employed in the preparation of a beverage. A new alkaloid named *Caffearine* has been isolated from coffee beans. (*Pharm. Journ.*, 29th June 1895.)

Medicinal uses.—Although its most extensive use is as a popular dietetic, coffee is sometimes prescribed as a nervous stimulant.

A strong infusion of black coffee is used as an antisoporific in opium-poisoning. In neuralgia and migraine it sometimes acts with beneficial effect.

COLA ACUMINATA.

Syn.—STERCULIA ACUMINATA.

THE KOLA NUT.

Kola has been for some years under experimental cultivation in India, seeds and plants having been supplied for this purpose from the Calcutta Botanic Gardens. It is a Native of the West of Africa and belongs to the natural order *Sterculiaceæ*. The Kola NUT was enthusiastically advocated some years ago as a valuable dietetic agent in sustaining the system against fatigue. Good nuts of African origin contain about 2·5 per cent. of *Caffeine* and 0·2 per cent. of *Theobromine* and a glucoside *Kolanin*.

COLCHICUM LUTEUM.

HERMODACTYLUS.

Vern.—Súrinján.

The true Colchicum (*Liliaceæ*) is not found in India. The bitter Hermodactyl (*Súrinjan-i-talkh*) imported from Kashmír, believed to consist of the corms of the above species of Colchicum and readily obtainable in the bazárs, is known to have properties resembling that of the drug obtained from *C. autumnale*, to which it also corresponds in appearance. A sweet or tasteless variety also sold (*Súrinjan-i-shírín*) imported from Arabia has been found to be inert. This has been referred to *Merendera persica*. It belongs to the same natural order, and each of these drugs contains an alkaloid.

Medicinal uses.—Diuretic and sedative. An acetous tincture prepared from the bitter variety is an efficient preparation. It may be used like that of colchicum in gout, rheumatism, torpidity of the liver and dropsy. It has, however, a depressing action for which it must be used with caution.

COLOCASIA ANTIQUORUM.

Syn.—ARUM COLOCASIA.

Vern.—*Beng.*—Kachú, Gumri-kachú ; *Hind.*—Ghuya ; *Sans.*—Kachú.

This plant, natural order *Aroideæ*, is to be found nearly all over India. It is cultivated in most parts of India for the tubers, which are an important article of food. It is preferred as a food in cases of œdema on account of its diuretic action.

Medicinal uses.—The fresh JUICE of the leaf stalks has been found to possess remarkable properties as a styptic for wounds, which merit further attention.

CONVOLVULUS SCAMMONIA.

SCAMMONY.

Vern.—*Hind.* and *Arab.*—Sukh-munia.

This climbing plant, natural order *Convolvulaceæ*, is a native of Levant and Syria, found wild in Guzerat and cultivated in some parts of India. A GUM-RESIN—Scammony of the English markets and *Sukh-munia* of the Indian bazárs—is obtained by incision of the crown of the living ROOT. The juice is collected in shells and allowed to become concrete. It is not manufactured to any extent in India. The drug, as found in the bazárs, is generally much adulterated.

Medicinal uses.—Scammony resin is a powerful purgative. In inflammatory and irritable dropsies it is used as a hydrogogue cathartic.

COPTIS TEETA.

MISHMI TEETA: GOLD THREAD.

Vern.—*Beng.*—Mishmí Títá; *Hind.*—Títa; *Sind.*—Mahmira, Mámirán.

The plant, known as *Coptis Teeta*, natural order *Ranunculaceæ*, a native of the mountainous region bordering on Upper Assam, enjoys a high repute among the Mishmīs, Lamas and the Assamese. The ROOT of this plant is officinal. It is sent down to Assam in neat little baskets, with open meshes of narrow strips of bamboo or rattan, each basket containing about an ounce of small pieces of the dark-yellowish, bitter rhizome, from 1 to 3 inches long. It is not

easily available in the Bengal markets, the limited supply of the true drug being augmented by several substitutes which are plentiful in the Upper and Western Provinces. It contains the alkaloid *Berberine* so combined as to be readily soluble in water.

Medicinal uses.—It was introduced into the *Pharmacopœia of India* as a bitter tonic resembling calumba in its properties. The fluid extract is the most suitable preparation.

Substitutes.—Roots of certain species of *Picrorhiza* and that of *Thalictrum foliolosum* are found in the bazárs as substitutes for the true *mishmí títa*. It is difficult to distinguish these from the genuine article.

CORALLOCARPUS EPIGÆA.

Vern.—*Beng.* and *Hind.*—Rákas-gaddah; *Pers.*—Lufa.

A climbing plant, belonging to the natural order *Cucurbitaceæ* and found in the Punjáb, Sind and the Deccan.

Medicinal uses.—The Root has been administered in the form of powder, and has attained some reputation as an alterative in syphilis. The active principle is a glucoside resembling *Bryonin*.

CORCHORUS CAPSULARIS and C. OLITORIUS.

Jute.

Vern.—*Beng.*—Pat, koshta, Nalitapat; *Hind.*—Pat-san; *Sans.*—Nádika.

Seven or eight species of *Corchorus*, annual plants belonging to the natural order *Tiliaceæ*, are found in India, although they are not now regarded as indigenous.

Of these *C. olitorius* and *C. capsularis* are most extensively cultivated in Bengal, for the production of the well-known jute fibre which forms so important an article of the commerce of India. The former is grown chiefly in the jute-producing districts of Eastern Bengal and on the islands and moist low-lying lands of the Meghna and Brahmaputra rivers, and the latter in the northern, central and eastern districts of the province. In addition to its most important economic value, the leaves of the jute plant are used by the poorer classes of the Natives by whom it is cultivated, as an article of food and to some extent medicinally. A sort of spinach known as *nálita* is made from the leaves, which are more or less bitter, and they are also used with other vegetable curries as a stomachic and condiment. It was proposed some years ago to utilize the hard ends of the jute fibre (the part nearest the root, which is regarded as waste) in the production of alcohol or "jute whiskey" by converting the cellulose in which it so largely abounds into sugar by means of sulphuric acid and fermenting. This has not, however, been attempted on a commercial scale.

Medicinal uses.—The LEAVES of the jute plants are used as a cheap domestic medicine in Hindú households, especially in the districts where they are cultivated. The dried leaves are also obtainable in the bazárs of Bengal. An infusion with coriander and aniseed constitutes a simple bitter, used like chiretta as a stomachic and tonic, but having the advantage over that herb in being milder and not so heating.

The finely carded fibre has been used as a basis for antiseptic surgical dressings. It is highly absorptive and admirably suited for this purpose.

CORDIA MYXA.

SEBESTEN FRUIT.

Vern.—*Beng.*—Bal-phal ; *Hind.*—Lasorá ; *Sans.*—Búkam-padáruka ; *Bom.*—Bhokara.

A small deciduous tree, belonging to the natural order *Boragineæ*, growing nearly all over India and cultivated in Bengal.

Medicinal uses.—The well-known FRUIT is very mucilaginous and is highly esteemed as a demulcent in coughs. The BARK is astringent and is used in the form of a gargle.

CORIANDRUM SATIVUM.

CORIANDER.

Vern.—*Beng.*—Dhaniya ; *Hind.*—Dhaniá ; *Sans.*—Dhányaka ; *Arab.*—Kusbara ; *Pers.*—Kishniz.

Coriandrum sativum, natural order *Umbelliferæ*, is a herbaceous plant, extensively cultivated in all parts of India for its seeds (in reality small FRUITS) which are much used in India as a condiment. Indian coriander is also largely exported and forms a considerable part of the world's supply of this commodity. The individual fruits are somewhat larger than those grown in Europe. The unripe fruit possesses a very unpleasant odour, resembling that of bugs, from which circumstance the name coriander has originated, but this changes rapidly as ripening proceeds. It contains, to the extent of about ½ per cent., an essential OIL to which it owes its aromatic odour.

Medicinal uses.—Coriander is an excellent carminative and aromatic. It conceals the odour and flavour and corrects the action of senna better than any other aromatic,

and it enters into the composition of many of the preparations of that drug.

CORYDALIS GOVANIANA.

Vern.—*Beng.* and *Hind.*—Bhútkus.

A plant of the natural order *Fumariaceæ* growing plentifully on the North-West Himálayas. The ROOT contains a crystalline bitter principle which has been named *Corydaline.*

Medicinal uses.—The ROOT has not been tried medicinally to any extent. It is regarded as tonic and diuretic, and has been administered in doses of 10 to 30 grains, also as tincture and decoction.

COSCINIUM FENESTRATUM.

Vern.—*Beng.*—Haldí-gach; *Hind.*—Jhár-haldi; *Sans.*—Darvi, Dáru-haridrákam.

A climbing plant, natural order *Menispermaceæ,* found plentifully in the forests of Western India. The wood yields a yellow dye resembling turmeric. The ROOT is used medicinally and resembles calumba in some of its properties and contains *Berberine.*

Medicinal uses.—The ROOT is regarded as a bitter tonic and stomachic, and employed in the form of preparations similar to those of calumba.

COSTUS SPECIOSUS.

Vern.—*Beng.* and *Hind.*—Kúst, Kúsht, Kut.

An elegant climbing plant, belonging to the *Scitamineæ,* found plentifully all over Bengal and in some other parts of Eastern India. The ROOT was formerly regarded as

resembling orris and violets in its odorous property, but it would seem to have been confused with that of *Saussurea Lappa* (q.v.), the costus of the Greeks, the *kúsht* rhizome having practically no smell, and the oil distilled from it having an odour resembling Elecampane and only after standing a very faint odour of violets. (Schimmel, *Berichte*, 1895.)

Medicinal uses.—The ROOT of this plant has been used to some extent as a tonic and aphrodisiac.

CRATÆVA RELIGIOSA.

Vern.—*Beng.* and *Hind.*—Barún ; *Sans.*—Varuna ; *Bom.*—Váyavarná.

This tree, natural order *Capparideæ*, is usually cultivated in the vicinity of temples in Central India, Bengal and Assam. The *varuna* BARK as found in the bazárs is believed to be that of *C. religiosa* var. *Nurvala*, and the LEAVES those of var. *Roxburghii*.

Medicinal uses.—The BARK of the stem and ROOT of this plant have been regarded as useful in calculous affections, given in the form of decoction. They are said to promote the appetite, increase the secretion of the bile, act as a laxative, and remove disorders of the urinary organs.

The fresh LEAVES, bruised with a little vinegar and applied to the skin, act as a rubefacient and vesicant.

CRINUM ASIATICUM.

Vern.—*Beng.*—Sukh-darsan ; *Hind.*—Chindar ; *Bom.*—Nagdown.

A large plant, with handsome white inflorescence and graceful foliage, natural order *Amaryllideæ*, much cultivated in Indian gardens, and also found in low humid spots in various parts of India and in the Moluccas.

Medicinal uses.—The expressed juice of the fresh BULB is a useful emetic; in small doses diaphoretic. Its use is analogous to that of squill.

CROCUS SATIVUS.

SAFFRON.

Vern.—*Beng.*—Jáphrán; *Hind.*—Zafran, Késar; *Sans.*—Kumkuma; *Bom.*—Safran.

The saffron crocus, natural order *Irideæ*, a native of Asia Minor, is cultivated on a small scale in Persia and Kashmír. The dried stigmata of the well-known flowers constitute the saffron of commerce. Compressed into cakes it is called "Cake Saffron" (*késar-ki-roti*), ordinary saffron being called "Hay Saffron." It is seldom used medicinally, its chief value being as a powerful colouring agent. The drug, as used in India, is usually imported. It is sometimes found adulterated with the flowers of *Carthamus tinctorius* —the safflower. It is largely used by the Natives of India in religious rites and in the colouring and flavouring of food.

CROTON TIGLIUM.

THE CROTON.

Vern.—*Beng.*—Jaypál; *Hind.*—Jamál-gota; *Sans.*—Jayapála, Kanakaphala.

The crotons, a genus of plants belonging to the natural order *Euphorbiaceæ*, are found wild and widely distributed throughout India. The most important species, *C. Tiglium*, is plentiful in Eastern Bengal, extending to Assam and Burma and to Ceylon. The SEEDS form an important article of export, being the source of the *Oleum Crotonis* of the *Pharmacopœia*, which is contained in the kernels to the extent of about 50 per cent. The oil is usually expressed in Britain. The seeds of *C. oblongifolius* are occasionally found mixed with those of the true croton.

A new enquiry into the nature of the vesicating, or more strictly, pustule-producing constituent of croton oil* has resulted in the isolation, from the fatty acids which were formerly believed to be the active principle, of a resin possessing extraordinary power as a vesicant to which the vesicating property of the oil is due. It has been named *Croton Resin.* The *Croton-Oleic Acid* of Kobert and Hirscheydt has been found to be a mixture of oleic acid and croton resin.

Medicinal uses.—The SEEDS are used in India as a powerful cathartic, one seed being a full dose. The OIL is well-known for its remarkable purgative properties, which are also possessed by the LEAVES and WOOD. The oil is particularly valuable in cases where a minute and effectual dose is required, one drop on sugar or in emulsion being usually sufficient for an adult. Externally it is of great value as a stimulant rubefacient and vesicant, the official liniment being perhaps the most desirable preparation.

CUBEBA OFFICINALIS.

See PIPER CUBEBA.

CUCUMIS MELO.

THE MELON.

Vern.—*Beng.*—Kharmuj ; *Hind.*—Kharbuja ; *Sans.*—Kharvujá ; *Bom.*—Kharabuja.

This well-known plant of the *Cucurbitaceæ* is indigenous to, and largely cultivated in, India, particularly in Northern Bengal, and also in Kashmír and Afghanistan. The sweet fruit is greatly esteemed both by Europeans and Natives; the seeds yield a quantity of oil which is utilized for emollient and burning purposes.

* By Prof. W. R. Dunstan, F.R.S., and Miss L. E. Boole, F.I.C., *Pharm. Journ.* IV, No. 1306, 6th July 1895.

Medicinal uses.—The SEEDS are diuretic, and the FRUIT cooling and depurative.

CUCUMIS SATIVUS.

THE CUCUMBER.

Vern.—*Beng.*—Sasá; *Hind.*—Khira; *Sans.*—Trapusha; *Bom.*—Kakri.

The cucumber, natural order *Cucurbitaceæ*, is said to be indigenous to Northern India, and it is stated to be found wild in the Himálaya from Kumáon to Sikkim. It is cultivated in gardens, and the FRUIT, as that of the melon, is used by the people for culinary purposes. The seeds yield a bland nutritious oil.

Medicinal uses.—Diuretic and nutritive. The powdered SEED has been employed as a diuretic in doses of 30 grains or more.

CUCURBITA PEPO.

THE PUMPKIN: VEGETABLE MARROW.

Vern.—*Beng.*—Kumrá; *Hind.*—Pethá; *Sans.*—Kushmanda.

The large fruit of this *Cucurbitaceous* plant is eaten by the Natives in their curries, and is extensively cultivated, very frequently on the roofs of houses, all over India.

Medicinal uses.—The SEEDS are anthelmintic, useful in cases of tænia. The expressed OIL of the seeds in doses of half an ounce repeated at an interval of two hours and followed by an aperient is said to be equally efficacious. The dried pulp is a remedy in hæmoptysis and hæmorrhages from the pulmonary organs, given in the form of a confection.

CUMINUM CYMINUM.

CUMMIN.

Vern.—*Beng.*—Jirá; *Hind.*—Zira; *Sans.*—Jíraka; *Pers.*—Zirá.

An important essential oil-yielding plant of the *Umbelliferæ*, extensively cultivated for its FRUITS in the North-West Provinces and the Punjáb, affording a considerable amount of commerce from Jubbulpur, Guzerat, and other places. Cummin is largely used by the people of India as a spice in curries. The cummin of the Punjáb is known as *kala-jírá*, being darker in colour and stronger in aroma.

Medicinal uses.—The FRUITS and the essential OIL to which they owe their properties and odour are aromatic, stomachic and stimulant. They are seldom employed medicinally, but both are used to some extent as a carminative and corrective in veterinary pharmacy.

CUPRUM.

COPPER.

Vern.—*Beng.*—Tama; *Hind.*—Tánbá; *Sans.*—Tamra.

Copper ore is found in the districts of Singbhúm and Hazáribagh, in Western Bengal, and smelting is carried on on a small scale.

The principal salt of copper used medicinally is the sulphate:—

CUPRI SULPHAS.

BLUESTONE.

Vern.—*Beng.*—Níl-tutiya; *Hind.*—Níla-túta; *Sans.*—Túttha, *Pers.*—Zake-sabz; *Burm.*—Douthá.

It is prepared in a fairly pure state by roasting the copper pyrites and crystallizing from solution in water. It may be obtained in all the bazárs.

Medicinal uses.—Applied locally as a stimulant, styptic and escharotic. Used in ophthalmia, leucorrhœa, gonorrhœa and ulcerations. Internally as an astringent in cases of chronic diarrhœa and dysentery in doses of $\frac{1}{8}$ to $\frac{1}{4}$ grain, as an emetic in doses of 8 to 10 grains.

CURCULIGO ORCHIOIDES.

Vern.—*Beng.*—Tála mulí; *Hind.*—Kali-musli, Siya-musli; *Sans.*—Mushali, Tála-mulika; *Tam.*—Nilap-panaik-kizhangu; *Tel.*—Nalla-tady-gudda; *Bom.*—Múslí-kand.

A small herbaceous plant, belonging to the natural order *Amaryllideæ*, found in the hotter parts of India. The tuberous Roots constitute the *kali* (black) *múslí* of the bazárs, the white variety *safed musli*, being the tubers of *Asparagus adscendens* (q. v.)

Medicinal uses.—The Root is demulcent, diuretic and aphrodisiac. It is largely prescribed in native medicine, usually combined with bitters and aromatics.

CURCUMA AMADA.

Mango Ginger.

Vern.—*Beng.*—Amádá; *Hind.*—Ama-haldi; *Sans.*—Karpura-haridrá.

This plant is found in Bengal, chiefly on the hills. The tubers are used as a condiment. The *Curcuma* species belong to the natural order *Scitamineæ*.

Medicinal uses.—The Tubers have been regarded as stomachic and carminative, cooling and useful in prurigo. The infusion is used to produce the flavour of the mango artificially in confectionery.

CURCUMA ANGUSTIFOLIA.

East Indian Arrowroot.

Vern.—*Beng.* and *Hind.*—Tikur; *Sans.*—Tavakshri.

Found plentifully in Bengal and in the Central Provinces, extending to Bombay. The tubers of this and other species are the chief source of East Indian arrowroot which is so highly valued as an article of diet. It is largely manufactured and exported at Travancore.

The better qualities are not much inferior to that of the *Maranta* (q. v.) or Bermuda arrowroot.

CURCUMA AROMATICA.

Wild Turmeric: Yellow Zedoary: Cochin Turmeric.

Vern.—*Beng.*—Ban-halud; *Hind.*—Jangli-haldi; *Sans.*—Vanaharidrá; *Tam.*—Kasturimanjal; *Tel.*—Kasturi-pasupa.

Found wild all over Bengal and largely cultivated in gardens. The rhizomes yield a yellow colouring matter like turmeric, and the fresh root has a camphoraceous odour.

Medicinal uses.—The dried Rhizome is used as a carminative and aromatic adjunct to other medicines. It is also used externally, bruised in oil, as an application in sprains and bruises.

CURCUMA LONGA.

Turmeric.

Vern.—*Beng.*—Halud; *Hind.*—Haldi; *Sans.*—Haridrá; *Tam.*—Manjal; *Tel.*—Pasupa; *Pers.*—Zard-chubah.

The turmeric plant is indigenous and extensively cultivated in all parts of India for its rhizomes, which are

an essential ingredient in curries. It is employed for culinary purposes as a colouring agent and condiment, and it is very largely employed in India as a dye. The rhizomes are to be found in every bazár throughout India, and a specially prepared variety from a harder root is sold for dyeing purposes. It yields a bright but fleeting yellow which is turned red by alkalis. The colouring principle has been isolated and named *Curcumin*. It has the peculiar property of combining with boracic acid in presence of a mineral acid to form a brown compound, thus providing a reliable test for boracic acid. The yellow colour and aromatic principles seem to be developed as the rhizomes attain the full season's growth. The mature rhizome contains a yellow essential oil. The employment of turmeric is regarded as essential in certain religious ceremonies of the Hindús.

Medicinal uses.—Stimulant and carminative. Made into a paste with lime the powdered RHIZOME is very successfully applied to relieve sprains and bruises. In catarrh, or severe 'cold in the head,' the inhalation of the fumes of burning turmeric is said to cause a considerable discharge of mucus from the nostrils, and instant relief is experienced. In catarrhal and purulent conjunctivitis a decoction of turmeric has been recommended as a remedial lotion.

CURCUMA ZEDOARIA.

THE ROUND ZEDOARY.

Vern.—*Beng.*—Sati; *Hind.*—Kachúr; *Sans.*—Sati, Kachura; *Tam.*—Pulan-kishanga; *Tel.*—Kachóram; *Pers.*—Kazhúr.

A plant cultivated in gardens in many parts of India for its root which is an important article of native per-

fumery. This rhizome also constitutes the basis of the red *abir* powder, which is mixed with water and scattered over the person at the *holi* festival of the Hindús. The zedoary is greyish white externally, grey internally, and with an aromatic odour allied to ginger but camphoraceous.

Medicinal uses.—The RHIZOME is to be regarded as a mild carminative and aromatic stimulant, useful in flatulence and dyspepsia, and as a corrector of purgatives. Combined with alum in water it is also applied to bruises.

CUSCUTA REFLEXA.

THE DODDER.

Vern.—*Beng.*—Algoch-latá, Algusi; *Hind.*—Akas-bel; *Sans.*—Amaravela; *Pers.*—Aftímún.

A parasitic climbing plant, belonging to the natural order *Convolvulaceæ*, found plentifully in the plains of India on certain hedges and bushes—*Euphorbia tirucalli*, *Adhatoda*, *Ficus*, and others.

Medicinal uses.—The SEEDS have been regarded as carminative.

CYDONIA VULGARIS.

THE QUINCE.

Vern.—*Beng.*—Bihi-dana; *Hind.*—Bihi; *Tel.*—Shimai-madalai-virai; *Pers.*—Bihí-dánah.

Cultivated in Afghanistan and Northern India: natural order *Rosaceæ*. The delicious fruits are highly esteemed when ripe. They are largely exported from Cabul.

Medicinal uses.—The SEEDS contain a large proportion of mucilaginous matter. They are used to some extent

in decoction as demulcent. The astringent seeds of the unripe fruits have been used in diarrhœa.

CYNODON DACTYLON.

Couch Grass: Dog's Tooth Grass.

Vern.—*Beng.* and *Hind.*—Durba, Dub; *Sans.*—Durva.

An elegant perennial grass (*Gramineæ*) found plentifully all over India. The creeping root stock is used medicinally.

Medicinal uses.—A decoction of the Rhizome is diuretic and valuable in cases of vesical calculus and in anasarca. In India the juice of the green grass is applied as a popular application to bleeding wounds as an astringent. It has also been applied in catarrhal ophthalmia.

CYPERUS ROTUNDUS.

Vern.—*Beng.* and *Hind.*—Muthà; *Sans.*—Mustá.

A plant belonging to the natural order *Cyperaceæ*, found plentifully throughout the plains of India.

Medicinal uses.—The Root is diaphoretic and astringent.

CYPERUS SCARIOSUS.

Vern.—*Beng.*—Nagar-mútha; *Hind.*—Nagar-móthá; *Sans.*—Nagar-mustaka.

A delicate slender grass found in moist places in Bengal. The roots of this and other species yield a pleasing fragrance when bruised. Medicinally the Root of *C. scariosus* is used for the same purposes as those of *C. rotundus.*

DÆMIA EXTENSA.

Syn.—ASCLEPIAS ECHINATA.

Vern.—*Beng.*—Chhágalbánti; *Hind.*—Sagowani; *Bom.*—Utarni.

A climbing plant found in the hotter parts of India. The whole PLANT has been used medicinally. The leaves contain an alkaloid *Dœmine* (Hooper, 1890).

Medicinal uses.—Expectorant and emetic. The juice of the LEAVES is considered useful in asthmatic affections.

DATURA FASTUOSA.

THE BLACK DATURA.

Vern.—*Beng.*—Kala-dhuturá; *Hind.*—Kala-dhutura; *Sans.*—Dhattúra, dhustura; *Pers.*—Tatulah; *Arab.*—Jouz-ul-mathil, methel,

AND

DATURA FASTUOSA.

VAR.—ALBA.

Syn.—DATURA ALBA.

Vern.—*Beng.*—Dhutura (sada); *Hind.*—Saféd-dhátura; *Sans.*—Dhustura, Ummatta-vriksha; *Tam.*—Umatai; *Pers.*—Kouz-másab-safed.

These plants, of the natural order *Solanaceæ*, are found wild, not usually cultivated, throughout the hotter parts of the Peninsula, growing often in waste places. They have long been known to the people of India for their intoxicating and narcotic properties, the former being the more powerful and frequently administered in sweetmeats and in various other ways for effecting criminal designs. The *thugs* or *daturias*—Indian professional datura poisoners—

so common in former years, but now practically exterminated, relied chiefly on the datura to aid them in their depredations. The drug was not administered with the intention of killing but of producing temporary insensibility, although an overdose frequently had fatal effect. At the present time the seeds are in popular use in India by the dissipated and depraved in combination with *sabjí* to induce a state of delirious stupefaction. They are also frequently used in adulterating several intoxicants such as toddy, *majúm*, and the like, with the object of increasing their stupefying property, and in conjunction with *gánja*. A profound lethargy, resembling coma, combined with delirium, difficulty of respiration and dilation of the pupils are the symptoms induced by the administration of the drug. The plants contain the alkaloid *Daturine*, the active principle of *D. Stramonium* (q. v.)

Medicinal uses.—The LEAVES and SEEDS of the variety *alba* were made official in the *Pharmacopœia of India*, and of these a tincture, extract, plaster and poultice are directed to be made. Both plants are narcotic, anodyne and antispasmodic, and in large doses virulent poisons: useful in neuralgia, gastrodynia and emphysema of the lungs, and regarded also as valuable in epilepsy and mania. The datura possesses properties analogous to those of belladonna, and is sometimes used to dilate the pupil of the eye. The practice of smoking the dried leaves and stems is attended with great success and relief in spasmodic asthma and kindred affections. A decoction of the leaves has been recommended as an internal remedy for the prevention of hydrophobia. The fresh juice of the leaves is mixed with emollients and applied externally in rheumatic pains.

DATURA STRAMONIUM.

STRAMONIUM: THORN APPLE.

Vern.—*Beng.* and *Hind.*—Dhutura.

Indigenous to India and abundant on the temperate Himálaya. The plant is used in the hills for the same popular uses as those belonging to the plains. The SEEDS and LEAVES contain the alkaloid *Daturine*, which has been found to be practically identical in chemical composition with *Atropine*—the alkaloid of belladonna—and as such is regarded as one of the mydriatics, although the fact that it only possesses about half the physiological activity does not correspond to the chemical constitution. It is identical with *Hyoscyamine* in its chemical and physiological properties. It has also been shown that stramonium contains two alkaloids—heavy and light daturine—the former consisting of atropine and hyoscyamine, and the latter of hyoscyamine only.

Medicinal uses.—The chief use of the drug is in asthma, the dried LEAVES of this variety and of that of the variety *tatula* [*gharbhúli* (Bombay)] made into cigars and cigarettes, being smoked for this purpose. It is used internally in place of belladonna as having more direct action on the respiratory organs. An extract and tincture are official in the *British Pharmacopœia*.

DAUCUS CAROTA.

THE CARROT.

Vern.—*Beng.*—Gájar; *Hind.*—Gájar; *Sans.*—Garjara; *Tam.*—Gájjara-kelangu; *Tel.*—Gajjara-gedda; *Pers.*—Zardak.

The carrot, natural order *Umbelliferæ*, is indigenous to Kashmír and the Western Himálaya, and is now largely

cultivated in India for culinary purposes. It is not used to any extent in European medicine, but the Natives employ the SEEDS to some extent.

Medicinal uses.—The SEEDS are used as a nervine tonic. Externally the familiar ROOT has been used as a stimulating application. The SEEDS yield a yellowish coloured volatile OIL, also regarded as a nervine tonic.

DELPHINIUM DENUDATUM.

Vern.—*Hind.*—Nirbisi, jadwár.

An annual plant, belonging to the natural order *Ranunculaceæ*, growing abundantly on the slopes of the temperate Himálaya. It is of little importance medicinally, but has been the subject of much controversy as to whether the ROOT should be regarded as the *Nirbisi* of ancient Sanskrit *Materia Medica*. It has properties resembling those of *atís*, and has been classed among the "non-poisonous aconites." The term *jadwar* has, however, been applied to very different plants at different times. As sold in the bazárs the root appears usually to have undergone some kind of preparation.

DESMODIUM GANGETICUM.

Vern.—*Beng.*—Salpáni; *Hind.*—Sarivan; *Sans.*—Salaparni.

Natural order *Leguminosæ*: a small shrub common on the Lower Himálaya and in the plains.—The plant is interesting, as being the chief of the ten ingredients in the *Dasamula kvatha* of Hindú medicine. It is regarded as febrifuge and anti-catarrhal.

DILLENIA INDICA.

Vern.—*Beng.* and *Hind.*—Chalta ; *Sans.*—Ruvya.

A large evergreen tree found in Bengal, Central and South India and Burma. Natural order *Dilleniaceæ.*

Medicinal uses.—The juice of the FRUIT, mixed with sugar and water, is considered a cooling beverage; expectorant in coughs ; the BARK and LEAVES are astringent.

DIOSPYROS EMBRYOPTERIS.

Vern.—*Beng.*—Gab; *Hind.*—Téndú; *Sans.*—Tinduka; *Tam.*—Tumbika ; *Tel.*—Tumil ; *Pers.*—Abnuse-pindi.

This tree, natural order *Ebenaceæ,* grows commonly all over India. The BARK and unripe FRUIT are astringent, the latter yielding a juice of remarkable astringency containing 20 to 40 per cent. of tannic acid. The infusion of the unripe fruit is extensively used for tanning fishing nets to render them more durable. When ripe the fruit loses its astringency and is eaten by children.

Medicinal uses.—The juice of the FRUIT is astringent and styptic : useful in diarrhœa and chronic dysentery and in hæmorrhages from the internal organs. An infusion of the fruit is used as a gargle in aphthæ and sorethroat.

DIPTEROCARPUS TURBINATUS
and other species.

GURJUN : KANYIN.

Vern.—*Beng.* and *Hind.*—Garjan, Tihya-garjan (the balsam), Teli-garjan ; Garjan-ka-tel.

The above and several other species of the genus *Dipterocarpus,* natural order *Dipterocarpeæ,* yield collectively

the balsamic product known in India as GURJUN OIL or Balsam or "Wood Oil." The most important is the variety *turbinatus*, or *kanyin* tree, a magnificent evergreen tree growing plentifully in Eastern Bengal, Burma, Chittagong and Pegu to Singapore, sometimes attaining a height of 200 feet. *D. alatus* and *incanus* are also found in the Chittagong district, the former extending to the Andaman Islands. *D. turberculatus*, the *eng* or *in* tree of Burma, yields a thick honey-like OLEO-RESIN, which is probably mixed with the product of the other trees.

Different methods are followed in different districts for the collection of the *Dipterocarpus* balsam, and the product varies accordingly.

The usual method is to cut a series of cavities in the trunk of the growing tree, live charcoal being placed in them to aid the flow of the resinous oil. When this ceases a fresh portion of the sap-wood is cut and re-charred. The *in* oil of Burma is extracted without the aid of heat.

Gurjun oil is usually found in the bazárs of Eastern India as an OLEO-RESIN of which there are three principal varieties —the pale (*safed garjan-ka-tel; safed lakri-ka-tel*); the red or reddish brown (*lal*), and the black (*kálá*) or dark brown. The pure pale oil is somewhat fluorescent with a greenish-grey colour seen by reflected light, transparent and reddish brown in strong daylight. It has a feeble aromatic copaiba-like odour and a bitter aromatic taste without the persistent acridity of copaiba.

Subjected to simple distillation with water the oleo-resin yields an essential OIL to the extent of 30 to 40 per cent. and leaves a dark-coloured viscid resin. The former has the peculiar property that when it is heated to 130° it

becomes gelatinous and does not resume its fluidity on cooling, while the resin has been found like that of copaiba to contain a crystallizable portion which has been called *Gurjunic Acid.*

Gurjun balsam is largely produced in Burma, Chittagong, and the Malayan Peninsula, and occasionally exported. It is known to be used to some extent as an adulterant of copaiba. This may be detected by its complete solubility in mineral naphtha, copaiba not being completely soluble. It is largely used in India as a natural varnish, and might be extensively utilized for water-proofing, being an effective solvent of caoutchouc.

Medicinal uses.—The OLEO-RESIN has properties analogous to copaiba, and it was hoped many years ago that it would supersede in India the South American balsam. It has undoubted efficacy in the conditions for which its use has been advocated—gonorrhœa and gleet and the like—administered in doses of half to one fluid drachm as emulsion with mucilage acacia or an alkali. In consideration of this it was made official in the *Pharmacopœia of India.* Externally it has a stimulant action, and has been applied to indolent ulcers.. It was strongly recommended and extensively tried some years ago as a specific for leprosy, but it was found that while it acted admirably as a palliative it could not claim to be considered a cure. It is useful in psoriasis and kindred skin affections mixed to the consistence of cream with equal parts of lime water and applied freely, and the pale oil given internally to the extent of two drachms three times a day. The addition of chaulmágra oil has been found to enhance the effect. The essential OIL may be administered internally in place of the oleo-resin.

DOLICHOS BIFLORUS.

HORSE GRAM.

Vern.—*Beng.*—Kurti-kalai; *Hind.*—Kúltí; *Sans.*—Kulattha.

A common twining plant of the *Leguminosæ*, growing all over India. It affords a valuable fodder.

Medicinal uses.—A decoction of the PLANT has some reputation as a remedy in leucorrhœa.

DRACOCEPHALUM ROYLEANUM.

See LALLEMANTIA ROYLEANA.

DROSERA BURMANII and D. PELTATA.

Vern.—*Hind.*—Mukha-jali.

These curious little insectivorous plants, somewhat resembling the British Sun-dew and belonging to the same natural order, *Droseraceæ*, are common in sandy soil,—the former in the Chutia Nagpur and Orissa districts and around Burdwan and in Burma, and the latter on the Himálayas and Nilgiris.

Medicinal uses.—The leaves of the *Drosera* are occasionally used in some parts of India, either bruised or sometimes mixed with salt as a blister. Placed in milk they rapidly curdle it,—a property attributable to the peculiar peptic-like ferment which the leaves are capable of secreting. They also contain a red crystalline colouring matter.

ECLIPTA ALBA.

THE KESURI.

Vern.—*Beng.*—Keysuria, Kesuti; *Hind.*—Moch-rand, Babri; *Sans.*—Kesarája.

A weed belonging to the *Compositæ*, abundant throughout India and plentiful on the Himálaya.

Medicinal uses.—The ROOT has been recommended as an excellent substitute for that of taraxacum. The expressed juice of the LEAVES has been used as a tonic and deobstruent in hepatic and splenic enlargements and in skin diseases, being also in the latter case applied externally.

ELETTARIA CARDAMOMUM.

CARDAMOM: THE LESSER CARDAMOM.

Vern.—*Beng.*—Elachi, Gujrati eláchi; *Hind.*—Chhoti eláchi; *Sans.*—Ela; *Tam.*—Ellakay; *Tel.*—Elakáya; *Bom.*—Malabari-elachi; *Pers.*—Kakilahe-khurd.

This plant, natural order *Scitamineæ*, tribe *Zingiberaceæ*, is a native of the mountainous tracts of Malabar, the Cochin and Travancore forests, Kanara, Mysore and Madura, and it is also found wild in Burma. It is cultivated for its fruit in many parts of Southern India and Ceylon, and largely exported, although the trade has fallen off to some extent in recent years. It yields the cardamoms of commerce, the familiar capsular fruits being previously washed in water containing the powdered fruit of the soap-nut (*Sapindus trifoliatus*) and afterwards bleached in the sun, while they are further treated in some places by a process of "starching" to render them whiter. This fruit and that of *Amomum subulatum* (q. v.) known as the "Greater or Nepal Cardamom" have been used in India from a remote period as a condiment and as a constituent of the universal Oriental masticatory.

Medicinal uses.—The SEEDS are valuable as a warm cordial and aromatic carminative stimulant due to an essential OIL, which is their characteristic constituent.

EMBELIA RIBES and E. ROBUSTA.

Vern.—*Beng.*—Biranga; *Hind.*—Baberáng; *Sans.*—Vidanga; *Tam.* and *Tel.*—Váyu-vilamgan; *Bom.*—Vaivarang.

The former is a large climber abundant in the hilly parts of India from the Central Himálaya to Ceylon and Singapore; common about Bombay, also in Burma. The latter is found chiefly in Bengal and Burma extending to the Lower Himálaya. They belong to the natural order *Myrsineæ*. The berries of *E. ribes* somewhat resemble those of black pepper, which they are sometimes used to adulterate.

Medicinal uses.—The dried berries of both varieties are carminative, stomachic and stimulant: given in infusion they act as a certain anthelmintic, especially in tapeworm. The active principle was discovered by Warden (1888) to be *Embelic Acid*.

ENHYDRA FLUCTUANS.

Vern.—*Beng.*—Hingchá; *Hind.*—Harhuch; *Sans.*—Hílamochiká.

An aquatic plant, natural order *Compositæ*, found in Eastern Bengal, Assam and Sylhet.

Medicinal uses.—The expressed juice of the LEAVES has been used as a laxative.

ENICOSTEMA LITTORALE.

Vern.—*Beng.* and *Hind.*—Chhota-kiráyata.

A herb, belonging to the natural order *Gentianaceæ*, common in the plains but not found in Bengal. It is a popular stomachic tonic, and known in some parts as the *chhota* (small) chiretta.

ENTADA SCANDENS.

THE GILLA NUTS.

Vern.—*Beng.*—Gilla ; *Bom.*—Gardal, Pilpipta.

Natural order *Leguminosæ*. A climbing plant found on the Eastern Himálaya, in Eastern Bengal, Southern India and Burma.

Medicinal uses.—The SEEDS are used as an emetic, occasionally as a febrifuge. They contain *Saponin*.

ERYTHRINA INDICA.

THE INDIAN CORAL TREE.

Vern.—*Beng.*—Palitá-mádár ; *Hind.*—Pangra ; *Sans.*—Parijata ; *Tam.*—Muruká ; *Tel.*—Barijamu.

This tree, natural order *Leguminosæ*, well-known by its bright, red-coloured flowers, is common in Bengal and many parts of India, often grown in gardens as a support for black pepper and coffee plants.

Medicinal uses.—The BARK is used medicinally, being regarded as antibilious and febrifuge. The LEAVES are applied externally to disperse buboes and the like. The bark and leaves contain a poisonous alkaloid named *Erythrine*.

ERYTHROXYLON COCA.

THE COCA PLANT.

The experimental cultivation of this South American shrub has been carried on for some years in India and Ceylon in the tea districts with some success. The climate and soil of many parts of India, at moderate altitudes, have been found suited to the plant, and the leaves, when carefully collected and dried, have been found

rich in the crystalline alkaloid *Cocaïne*, the yield increasing with the age of the plant, but it is doubtful if the cultivation would be a success commercially. It belongs to the natural order *Lineæ* (*Erythroxylaceæ*), and is a native of Peru and Bolivia. *E. monogynum* grows wild and plentifully in Madras, but it contains no alkaloid analogous to cocaïne.

Medicinal uses.—The LEAVES have the property when chewed, due to the cocaïne they contain, of affording remarkable sustaining power, which has been largely taken advantage of in the native habitat of the plant and of late in military operations. The alkaloid and its salts are stimulant and restorative: injected hypodermically and painted externally they produce local anæsthesia; cocaïne also produces mydriasis, hence much used and highly valued in minor operations and in ophthalmic surgery. The action usually commences in about three minutes and ceases in about half an hour.

EUCALYPTUS GLOBULUS.

THE BLUE GUM TREE.

Several species of the *Eucalyptus* trees, natural order *Myrtaceæ*, of Australia and Tasmania, have been cultivated in India, chiefly on the Nilgiris, with considerable success, the *globulus* variety being the most suitable. The well-known Eucalyptus OIL, distilled from the LEAVES, is greatly valued in India for its antiseptic, rubefacient, stimulating and antispasmodic properties, much used as an inhalant. The active constituent is a crystallizable body *Eucalyptol* (*Cineol*), to which the medicinal virtue must be ascribed. The RED GUM or Eucalyptus Kino which exudes from the BARK of several species is an astringent.

EUGENIA JAMBOLANA.

Syn.—SYZYGIUM JAMBOLANUM.

JAMBUL : THE BLACK PLUM.

Vern.—*Beng.* — Kála-jám ; *Hind.* — Jáman ; *Sans.* — Jambula ; *Tam.*—Nával ; *Tel.*—Naredu ; *Bom.*—Jambul.

A tree, belonging to the natural order *Myrtaceæ*, and found nearly all over India, extending from the Himálaya to Southern India. It yields an abundance of a sub-acid edible fruit, astringent when unripe.

Medicinal uses.—The BARK is astringent, and is used as such in decoctions and gargles. The SEED, or stone of the fruit, has acquired some reputation as a remedy in diabetes, and is believed to check the diastasic conversion of starch into sugar in that form of the disease depending on increased production of glucose, but although many favourable reports as to its use have been published, it would not appear to have justified the high claims originally made for it. The liquid extract, prepared by re-percolation with a weak alcoholic menstruum, is the most suitable preparation. A careful research by Mr. T. Stephenson, F.C.S., into the comparative medicinal value of old and fresh seeds, and of the kernel and pericarp and into the various processes for the production of medicinal preparations, has led to the conclusion that only fresh seeds, freed from the pericarp (skin and pulp), should be used and that heat should be avoided in their extraction. (*See* Appendix: Fluid Extracts). An unstable glucoside named *Jambulin* has been said to exist in the seeds, which also contain gallic acid, but the medicinal principle has not yet been fully investigated. The dose of the extract is ½ to 2 drachms, and that of the powder 5 to 30 grains.

EULOPHIA CAMPESTRIS.

Vern.—*Beng.*—Sung misrí, Salep-misrí.

An orchid found in Oudh and collected for its tubers which are regarded as an excellent and nutritious *salep-misrí* by several of the peoples in Northern India. *E. vera* is also believed to be one of the sources of Indian *salep*.

EUPATORIUM AYAPANA.

Vern.—*Beng.*—Ayapan.

A shrub found in many parts of India; natural order *Compositæ*, a Native of Brazil. The leaves were formerly extolled as a remedy in the treatment of snake-bite, but are now regarded as a simple tonic and diaphoretic. The plant contains a neutral principle, *Ayapanin*.

EUPHORBIA ANTIQUORUM.

Vern.—*Beng.*—Narsij, tekátá sij; *Hind.*—Tidhára sehund; *Sans.*—Vajra-kantaka; *Tam.*—Tirikalli; *Tel.*—Bomma jemudu.

A small tree, common in India, chiefly in Bengal, natural order *Euphorbiaceæ*.

Medicinal uses.—The fresh milky JUICE of the plant is an acrid irritant, used in rheumatism. Internally it acts as a violent purgative.

EUPHORBIA NERIIFOLIA.

Vern.—*Beng.*—Mansa-sij; *Hind.*—Sij, sehund; *Tam.*—Ilaik-kalli; *Tel.*—Aku-jemudu.

A small tree found in Central India and cultivated in Bengal. The branches of this tree yield a white acrid milky juice which is formed into a guttapercha-like substance on boiling.

Medicinal uses.—The milky JUICE is regarded as purgative internally and rubefacient externally. It is used to remove warts and similar excrescences, and to afford relief in earache.

EUPHORBIA PILULIFERA.

Vern.—*Beng.*—Bura-keru, Khirui'; *Hind.*—Dudhi; *Bom.*—Nayeti.

A small erect herb of the *Euphorbiaceæ*, common nearly all over India.

Medicinal uses.—The fresh PLANT is used largely in India in affections of children, chiefly in bowel-complaints and chest affections. A fluid extract of the plant was strongly advocated some years ago as a specific for asthma. It has been found decidedly useful lately as a remedy in acute and chronic dysentery.

EURYALE FEROX.

THE GORGON FRUIT.

Vern.—*Beng.* and *Hind.*—Makhana.

An aquatic plant, of the natural order *Nymphaceæ*, found in the ponds of Bengal, Assam and Central India. The SEED has been regarded medicinally as useful in checking urethral discharge.

EXACUM BICOLOR.

Vern.—*Hind.*—Bará-chireta.

A plant belonging to the natural order *Gentianaceæ* and common in the Deccan.

Medicinal uses.—The ROOT has properties resembling gentian: the dried PLANT has aromatic tonic properties, and is sometimes sold as chiretta, being known as *country* chiretta.

FAGRÆA FRAGRANS.

A small evergreen tree, natural order *Loganiaceæ*, growing plentifully in Burma, Malacca and the Andamans.

Medicinal uses.—The BARK has been found useful in the treatment of malarious fever, and has been used to a considerable extent for this purpose in the districts to which the tree is indigenous. As the result of a careful chemical analysis made by the author some years ago the bark was found to contain an alkaloid which seemed to be isomeric with strychnine and to possess similar properties.

FEL.

PURIFIED BILE.

Vern.—*Hind.*—Safra; *Sans.*—Pitta.

The fresh gall of the ox, buffalo, wild-boar and goat and also of the peacock and certain fishes, are used in India as slight laxatives.

FERONIA ELEPHANTUM.

THE WOOD-APPLE.

Vern.—*Beng.*—Kath-bel; *Hind.*—Kaitha; *Sans.*—Kapittha; *Tam.*—Vilám; *Tel.*—Velága; *Burm.*—Mahan.

The wood-apple tree is met with throughout India. It belongs to the natural order *Rutaceæ*. It is cultivated to a considerable extent for its fruit, the pulp of which is edible and resembles bael in some respects. The tree yields in some quantity an important GUM occurring usually in small, roundish, transparent tears with a bland and mucilaginous taste and very closely resembling some of the better qualities of gum-arabic. Feronia or wood-apple gum yields a mucilage superior in adhesive property to that

made from gum-arabic. It differs slightly from the latter in chemical composition. It is seldom seen or employed.

Medicinal uses.—The ripe FRUIT is antiscorbutic and much esteemed by the people of India, given in the form of a *sherbet* or *chatni* either alone or in combination with the bael fruit. The unripe FRUIT is useful in diarrhœa and dysentery: it contains citric acid. The LEAVES are aromatic, carminative and astringent, with an odour resembling that of anise. The GUM is demulcent and may be used in place of the true gum-arabic.

FERRI SULPHAS.

Vern.—*Beng.*—Hirákas; *Hind.*—Hirákasis; *Sans.*—Kasisa.

Sulphate of iron is obtained by subjecting iron wire to the action of dilute sulphuric acid and evaporating the solution to crystallization. This is a common market article of India, which is used as a hæmatinic tonic like other preparations of iron. Iron Pyrites, sulphide or sulphuret of iron (Beng.—*Kangsmuki*) is also used in Hindú medicine.

Medicinal uses.—Powerful chalybeate tonic, astringent, emmenagogue, antiperiodic, and anthelmintic, poisonous in large doses. Locally applied, stimulant and astringent. Useful in anæmia, chlorosis, leucorrhœa, amenorrhœa, enlargement of spleen, intermittent fever, hypochondriasis, hooping cough and tænia. Locally useful in erysipelas, chancre, hæmorrhoids, prolapsus recti, and uterine cancer.

FERULA ALLIACEA.

Syn.—F. ASAFŒTIDA.

Vern.—*Beng.* and *Hind.*—Hing; *Sans.*—Hingu; *Tam.*—Kyam; *Guz.*—Hing; *Pers.*—Anguza.

A small herb of the *Umbelliferæ* growing wild and

plentifully in Eastern Persia and Afghanistan. This plant is the source of the asafœtida chiefly used in India. *F. Narthex*, the source of the true asafœtida, has been found* in Kashmír, but the drug is not collected in that country. The GUM-RESIN, with its characteristic odour, is to be found in all the Indian bazárs. It is obtained by incision of the living root from which a slice is cut every two or three days with the exudation adhering to it until the root is exhausted. It yields sometimes as much as ten per cent. of an essential OIL which is a sulphur compound of *allyl*.

Medicinal uses.—Asafœtida is stimulant and antispasmodic. It has been in popular use in India for many centuries, being known as *hing*, and the commoner varieties as *hingra*. It is particularly useful in nervous affections, and in hysterical and convulsive symptoms. The people of India also use it occasionally as a condiment.

FERULA FŒTIDA.

Syn.—F. SCORODOSMA.

Vern.—*Beng.* and *Hind.*—(The Gum-Resin), Hingra; *Sans.*—Hingu; *Bom.*—Hingra.

An *Umbelliferous* herb of larger stature than the preceding. It grows in Southern Turkestan, in Persia and Afghanistan. It is the source of much of the commoner qualities of the asafœtida of commerce, which are known in the bazárs as *hingra*. It is much adulterated, and slices of root are not unfrequently mixed with it. Its uses and properties will be found under *F. alliacea*.

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* See a valuable note on the subject by Mr. E. M. Holmes, F.L.S., in *Pharm. Journ.*, 18th August 1894, p. 131.

FERULA GALBANIFLUA.

GALBANUM.

Vern.—*Hind.*—Bireja ; *Arab.*—Barzad ; *Pers.*—Jawashir.

Another of the resinous *Umbelliferæ*, growing in Persia, whence the GUM-RESIN is imported into Bombay and re-exported to Egypt and Turkey. The resin is somewhat allied in its composition to asafœtida, and yields an essential OIL. It is not used in India.

FICUS BENGALENSIS.

THE BANYAN TREE.

Vern.—*Beng.*—Bar ; *Hind.*—Bar ; *Sans.*—Vata ; *Tam.*—Ala ; *Tel.*—Mari ; *Burm.*—Pyi-nyoung.

Natural order *Urticaceæ*. This well-known tree is wild in the Lower Himálaya and now found all over India.

Medicinal uses.—The ROOT fibres have been used in the form of decoction with sarsaparilla, and are believed to possess similar properties. The milky JUICE is applied externally to pains and bruises, and as an anodyne application in rheumatism. The BARK has been regarded as a tonic, and to be useful in the treatment of diabetes. A decoction of the bark, which contains about 10 per cent. of tannin, is used as an astringent lotion in leucorrhœa with advantage.

FICUS CARICA.

THE FIG.

Vern.—*Beng.*—Anjír ; *Hind.*—Anjír ; *Sans.*—Anjíra ; *Bom.*—Anjíra ; *Pers.*—Anjir.

Another member of the *Urticaceæ* cultivated throughout India. Fresh figs are to be found in all the Indian bazárs.

The so-called fruit when ripe contains 60 to 70 per cent. of grape sugar. They are seldom employed medicinally but are demulcent, emollient, nutritive and laxative. The pulp is occasionally used in the form of a poultice to promote suppuration.

FICUS CUNIA.

Vern.—*Beng.*—Dumur; *Hind.*—Khurkur; *Burm.*—Ye-kha-ong.

Found in the Lower Himálaya extending to Bengal and Burma.

Medicinal uses.—The FRUIT is given in aphthæ, and a bath prepared with the bark as a remedy in leprosy.

FICUS ELASTICA.

THE ASSAM RUBBER TREE.

Vern.—*Beng.*—Bor, Attah bar; *Burm.*—Nyaung bawdi.

This tree, which is one of the sources of the India-rubber of commerce, is indigenous in the moist evergreen forests of Assam, Burma and Chittagong, where it is cultivated along with several other members of the same genus. Natural order *Urticaceæ*. India-rubber is the inspissated milky sap, which contains Caoutchouc. Although of solely economic interest it is noticed in this place because of its universal application. In this connection may be noted the tree yielding

INDIAN GUTTA-PERCHA,

Dichopsis elliptica, natural order *Sapotaceæ*, known as the *Panchotí* tree and common on the Malabar Coast and in the forests of Coorg, Wynád and Travancore. The milky sap which exudes on incision yields a substance similar to gutta-percha and known as Pala-gum. It has

been used an adulterant of Singapore gutta. A careful examination and report by Mr. David Hooper shows that its chief objection is its extremely brittle nature which, he suggests, might be overcome by removing the crystalline matters which cause the brittleness and so obtain an article similar to the Malayan article.

Gutta-percha is used to some extent in pharmacy as a basis for medicinal plasters and the solution in chloroform (*Liquor Gutta-percha*, B. P.), and a similar solution known as Traumaticin as a protective application to bed-sores and as a vehicle for the application of chrysarobin and other medicaments in psoriasis.

FICUSGLOMERATA.

THE GULAR FIG.

Vern.—*Beng.*—Jajnaa dumur; *Hind.*—Gúlar; *Sans.*—Udumbara; *Tam.*—Atti; *Tel.*—Moydi; *Burm.*—Ye-tha-pan.

A large tree, belonging to the natural order *Urticaceæ*, found in the Sub-Himálayan ranges extending to Bengal and the Central Provinces, plentiful also in Assam and Burma.

Medicinal uses.—The BARK, LEAVES, and unripe FRUIT are astringent, and used as such as an external application and internally in dysentery. The fruit is said to be efficacious in diabetes.

FICUS HISPIDA.

Vern.—*Beng.*—Dumar; *Hind.*—Kagsha; *Sans.*—Kákadumbar; *Tam.*—Pe-atiss; *Tel.*—Bamari; *Burm.*—Kadut; *Pers.*—Anjír-dashte.

A small tree extending from the Himálaya southward to Central India, Burma, and the Andaman Islands.

Medicinal uses.—Emetic properties have been attributed to the FRUIT, SEEDS of the ripe fruit, and the BARK of this tree. The powdered bark was recommended in the *Pharmacopœia of India* as an antiperiodic and tonic. One drachm of the powdered seeds is sufficient for an emetic, the bark being given in doses of 30 or 40 grains, the action of the latter, however, being attended with purging.

FICUS RELIGIOSA.

THE PEEPUL TREE.

Vern.—*Beng.*—Ashathwa; *Hind.*—Pípal; *Sans.*—Aswaththamu ; *Bom.*—Jári, pimpal ; *Burm.*—Nyaung bandi.

The sacred peepul is a large tree found wild and cultivated in Bengal, Central India, and the Lower Himálaya.

Medicinal uses.—The ripe FRUIT is edible and laxative. The BARK is astringent.

FŒNICULUM VULGARE.

Syn.—F. DULCE.

INDIAN SWEET FENNEL.

Vern.—*Beng.*—Mauri, Pan-mauri ; *Hind.*—Saunf, Bari-saunf ; *Sans.*—Madhurika ; *Tam.*—Sohikire ; *Tel.*—Pedda-jila-kurra ; *Bom.*—Bari-shopha.

Found wild in some parts of India and largely cultivated for culinary purposes nearly all over the Peninsula. It is a perennial plant belonging to the *Umbelliferæ*. The FRUIT yields on distillation a pale yellow essential oil, to the extent of about three per cent., having the same chemical composition as oil of aniseed. It consists of crystallizable anethol or anise camphor, the remaining fluid portion being isomeric

with turpentine. The fruits are smaller and straighter than those of the *F. capillaceum*, the fennel of Southern Europe.

Medicinal uses.—The FRUITS and essential OIL are stimulant, aromatic and carminative, used largely as a flavouring agent or adjunct to other medicines. Fennel water, which is known in India as *Muhori-ka-arak* or *Arak-bádián*, is given to children in colic and flatulence. The LEAVES are also aromatic, and the ROOT is purgative.

FRAXINUS EXCELSIOR,

THE COMMON ASH,

and F. FLORIBUNDA.

MANNA ASH.

Vern.—(Manna); *Hind.*—Shir-khist; *Tam.* and *Tel.*—Méná; *Malay.*—Manna; *Arab.*—Shir-khist; *Pers.*—Shir-khist.

These ash trees, natural order *Oleaceæ*, grow to a large size on the temperate Western Himálaya. Like the manna ash (*F. ornus*) of Southern Europe they exude on incision of the stem a concrete saccharine "manna" which hardens into flat, whitish or pale yellowish flakes or tears. It has a pleasant honey-like taste, being composed for the most part of a sugar known as *mannite* which differs from cane and grape sugars in not being readily fermentable.

The mannas found in the bazárs of Northern India are:—Shir-khist, from *Cotoneaster nummularia* (*Rosaceæ*). Gazangabín, from *Tamarisk gallica* (*Tamariscineæ*), Taranjabín from *Alhagi maurorum* (*Leguminosæ*). Besides these, saccharine exudations are occasionally found on the willow, oak, plantain, and pine of the Himálayas, and the cultivated eucalyptus trees of the Nilgiris.

Medicinal uses.—The indigenous MANNA is not used to any extent in India, although the better qualities do not differ materially from the European article. It is a valuable mild laxative specially useful for children. The BARK is regarded as bitter and astringent. The LEAVES are purgative.

FUMARIA OFFICINALIS.

THE FUMITORY.

Vern.—*Beng.*—Ban-sulpha; *Hind.*—Pit-pápará; *Tam.*—Turá; *Tel.*—Chata-rashi; *Pers.*—Sháhtara.

This is a native of Persia. Another species, *F. parviflora*, is generally met with in the plains of India, often in rice-fields. They belong to the natural order *Fumariaceæ*.

Medicinal uses.—Although not now employed in European practice, fumitory is still used to some extent in India. The LEAVES and STEMS are regarded as laxative, diuretic, alterative and tonic. The herbs have been recommended in scrofulous skin affections.

GARCINIA INDICA.

KOKUM BUTTER: MANGOSTEEN OIL.

Vern.—*Hind.*—Kokum, Kokum-ka-tel; *Tam.*—Múrgul mara; *Bom.*—Kokum-chatel.

This tree grows plentifully in the Konkan and Kanara districts of Western India. It belongs to the natural order *Guttiferæ*. It yields abundantly a spherical fruit, about the size of a small apple, containing a purple pulp and seeds yielding about 30 per cent. of oil. This oil or "butter," consisting chiefly of *Tri-stearin*, is extracted by

one of several methods—boiling, cold extraction of the powdered seeds by water—which gives the best product, or simple expression. When solid it is made into egg-shaped lumps of about four ounces in weight and of a dirty white or yellowish colour and solid consistency, in which form it is usually found in the bazárs of Western India.

Medicinal uses.—The acidulous FRUIT has long been esteemed by the people of India as a semi-medicinal article of food, and in some parts in the preparation of acidulous drinks, being mildly astringent and cooling. The concrete OIL is nutritive, demulcent and emollient. It has been recommended as a substitute for cod-liver oil. It was included in the *Pharmacopœia of India* with the view to its adoption in the preparation of ointments, suppositories and the like. It has not, however, been used to any extent for this purpose.

GARCINIA MANGOSTANA.

THE MANGOSTEEN.

Vern.—*Beng.* and *Hind.*—Mangustín ; *Bom.*—Mangostín, Mengut ; *Mal.*—Manggusta ; *Burm.*—Mengkop.

The mangosteen FRUITS are largely imported into India from the Straits and Singapore, the native habitat of the tree, which belongs to the natural order *Guttiferæ*. It is also extensively cultivated in British Burma and the Malayan Peninsula, while it has been introduced with some success into the Madras Presidency and is grown in South Tenasserim. The experimental cultivation of the mangosteen in Bengal has completely failed. The palatable fruit, of the size and shape of a small apple, with thick woody, astringent rind, is much esteemed in India, the

succulent sub-acid internal portion being eaten as a table fruit. The rind has long been regarded as a valuable astringent of wonderful efficacy in diarrhœa and dysentery. It contains tannin, resin, and a principle which has been named *Mangostin* forming bright yellow laminar, odourless and tasteless crystals, and to which is probably due in some degree the special efficacy which the drug seems to possess in the conditions indicated. The BARK of the tree and young LEAVES are also very astringent.

Medicinal uses.—The RIND or entire dried FRUIT are employed as remedies in chronic diarrhœa and dysentery, usually in the form of a syrup, the drug being boiled in water, and sugar added to the strained decoction, previously evaporated to a suitable volume. It may also be employed in powder given in port wine or made into a paste with a little sugar, and in either form may be improved by the addition of aromatics.

GARCINIA MORELLA.

THE GAMBOGE TREE.

Vern. (The Tree)—*Beng.* and *Hind.*—Tamál; *Tam.*—Makki-maram; *Tel.*—Tamál.

(The Drug)—*Beng.*—Tamal; *Hind.*—Ghotá-ganba, Tamal; *Tam.*—Makki; *Tel.*—Revalchini-pál; *Pers.*—Rubbi-revánd.

The true gamboge tree, natural order *Guttiferæ*, grows plentifully in the forests of Eastern Bengal, and in Western India in the Malabar and Kanara districts. It is abundant also in Singapore and Ceylon. It yields a GUM-RESIN which is identical with that exported from Siam, and which might be put on the European markets if sufficient care were taken in its collection and preparation. At the

present time Indian gamboge is found in tears or agglutinated masses and is very impure. In the bazárs imported gamboge is usually sold in the familiar sticks formed by being run into pieces of hollow bamboo on its exuding from incisions in the tree. Several other species of *Garcinia* yield gamboge. It is used as a yellow dye and as a pigment, and by several classes of Hindús for their sectarial markings on the forehead.

Medicinal uses.—The GUM-RESIN is a valuable hydragogue cathartic and anthelmintic, usually in combination with other medicines.

GARDENIA GUMMIFERA and G. LUCIDA.

DIKAMALI OR CAMBI RESIN.

Vern.—(The Gum-Resin)—*Beng.* and *Hind.*—Dikamali; *Tam.*—Kumbai; *Tel.*—Tella-manga; *Bom.*—Dikamali; *Arab.*—Kunkham.

Both these trees, natural order *Rubiaceæ*, are common in many parts of India, particularly in the Central and Southern Provinces. They yield a GUM-RESIN which occurs in the form of irregular earthy-looking masses of a dull olive-green colour, consisting of the resin more or less mixed with portions of bark, sticks and other impurities. The odour is peculiar and offensive, like that of cat's urine. As it exudes from the trees it forms transparent tears at the tips of the young shoots and buds which are broken off with the adhering gum-resin and collected for sale. In this state it is transparent and of a bright yellow colour.

Medicinal uses.—The GUM-RESIN is antispasmodic and carminative. In dyspepsia attended with flatulence it has been frequently used with advantage.

GARUGA PINNATA.

Vern.—*Beng.*—Júm; *Hind.*—Ghogar; *Tam.*—Karvambú; *Bom.*—Kakad, Rúrak; *Burm.*—Chinyok.

This tree, natural order *Burseraceæ*, growing in the Sub-Himálayan range and found also in Burma, yields a greenish-yellow, translucent GUM-RESIN. It is not put to any economic or medicinal use of any importance.

GAULTHERIA FRAGRANTISSIMA.

INDIAN WINTERGREEN.

This plant, a member of the *Ericaceæ*, covers the hill tops for many miles in the Nilgiris. It is also found in Burma and Ceylon, and several species are common in Java and known as *Gandapuro*. The leaves yield a fragrant volatile OIL which is practically identical with that of the true wintergreen (*Gaultheria procumbens*), and which is at present not ultilized but might be exported with advantage, great quantities of the oil being used in France and in America. It consists almost entirely of *Methyl Salicylate* (which occurs frequently in the vegetable kingdom) and is the source of *natural* salicylic acid, which it contains to the extent of about 80 to 90 per cent. A small proportion of a colourless terpene which has been named *Gaultherilene* may also be present. A process was described in the *Pharm. Jour.* for October 1871, by Mr. Broughton, late Government Quinologist at Ootacamund, for the preparation of pure carbolic acid from the oil.

Medicinal uses.—The oil is aromatic, stimulant and carminative. It has been given with success in acute rheumatism and sciatica, its properties corresponding to those of the salicylates, in doses of 10 minims gradually increased, preferably in capsules. The oil is also applied

externally in liniments or in the form of a suitable ointment. It has powerful antiseptic properties, and may be used in small quantity for preserving vegetable preparations. It is also used as a pleasant flavouring agent, especially for dentifrices.

Substitutes.—In commerce the oil is being replaced by synthetical oil of wintergreen and by oil of birch, a distillate from the wood of *Betula lenta.*

GELIDIUM CORNEUM.

AGAR-AGAR: JAPANESE ISINGLASS.

Vern.—Chinia ghás.

The above and other species of *Algæ* or sea-weeds, collected on the sea-coast in Japan, are the source of the product known as *Agar-agar* also known as Thao and China Moss. It occurs in shrivelled, semi-transparent, membrane-like strips and consists of a substance which has been named *Gélose.* It has great gelatinizing power combining with 100 times its weight of water to form a jelly, having ten times the value in this respect of isinglass. The jelly of *Gelidium* differs from that of isinglass in its requiring a much greater degree of heat for its liquefaction. It is used to some extent in the preparation of jellies for invalids, as a dressing for giving a lustre to silk and other fabrics, and is now largely employed in bacteriology as a suitable *nidus* for germ culture. It has been lately recommended as a basis for suppositories, but its high melting point is an objection to its use for this purpose. Another product of a similar nature is the

CEYLON MOSS,

Gracilaria lichenoides, also known as *Agar-agar*, and in the bazárs under the same vernacular name. It is cast up on the coasts of Southern India and Ceylon. The gelatinizing

principle is believed to be the same as that contained in the so-called Japanese Isinglass. Ceylon Moss is much valued in India for the preparation of invalid delicacies and as an emollient and demulcent in pectoral affections.

ISINGLASS is prepared in India from certain fish and the fins of sharks.

GENTIANA KURROO.

INDIAN GENTIAN.

Vern.—*Beng.* and *Hind.*—Karu, Kutki; *Bom.*—Pháshánveda.

Several indigenous species of gentian, natural order *Gentianaceæ*, are common on the Himálaya, the *Gentiana Kurroo* being usually regarded as yielding the most useful ROOT. It abounds round Simla, extending to Kashmír, at altitudes of five to ten thousand feet. The ROOT has been regarded as an efficient substitute for the imported gentian, the root of *Gentiana lutea*. It contains the same principles, gentian bitter, *Gentianic Acid*, pectin and an uncrystallizable sugar, as the European root.

Medicinal uses.—Indian gentian ROOT is a valuable bitter tonic, the tincture and infusion corresponding closely to that of the European gentian. It might be employed with advantage to a much larger extent than at present.

GERANIUM ROBERTIANUM.

HERB ROBERT.

Several of the wild Indian geraniums (*Geraniaceæ*) are used medicinally for their astringent properties. They are to be found throughout the temperate Himálaya. Other geraniums which are used to some extent by the people in the districts where they abound are:—*G. nepalense* (*bhánda*), *G. ocellatum* (*bhánda*), *G. Wallichianum* (*liljahri*).

Medicinal uses.—The above PLANTS have the astringent and diuretic properties common to the genus. The Herb Robert was formerly much employed in European medicine in diarrhœa and hæmorrhages, but it has fallen into disuse probably on account of its fœtid odour. The other Indian species are free from this objection. The ROOTS have similar astringent properties.

GLORIOSA SUPERBA.

Vern.—*Beng.*—Bishalánguli ; *Hind.*—Karihári ; *Sans.*—Lángaliká ; *Tam.*—Kalaippaik-kishangu ; *Tel.*—Kalappa-gadda ; *Bom.*—Karianag.

An elegant climbing plant, belonging to the natural order *Liliaceæ*, flowering at the end of the rains, common in Bengal, and in low jungles throughout India. The root was formerly held in some esteem as a medicine and intensely poisonous properties resembling those of aconite were ascribed to it. An investigation made by Warden showed the presence of two resins and a bitter principle which he named *Superbine.*

Medicinal uses.—The tuberous ROOT may be regarded as tonic and stomachic in doses of 5 to 10 grains. It has been employed as an anthelmintic for cattle.

GLYCYRRHIZA GLABRA.

LIQUORICE.

Vern.—*Beng.* — Yashti-madhu ; *Hind.*—Muleathti ; *Sans.*—Yashti-madhu ; *Tam.*—Anti-ma-duram ; *Tel.*—Yashti-madhukam ; *Bom.*—Jethimadh.

The dried ROOT and subterranean stems of *Glycyrrhiza glabra*, natural order *Leguminosæ*, are quite common in the bazárs of India, being chiefly imported. Indigenous

liquorice finds its way into the Bombay market from Karachi and from around Peshawar where it is cultivated to some extent. These roots resemble in internal structure and constitution the imported drug, the sweet taste being due to a compound, *Glycyrrhizate of Ammonium*, and containing sugar and albuminous matter. Liquorice has been in popular use in India medicinally for many centuries.

Medicinal uses.—The ROOT is a pleasant demulcent for coughs and sore-throat, and is used in pharmaceutical preparations as an adjunct. The liquid extract is specially useful in disguising the taste of nauseous medicines.

GMELINA ARBOREA.

Vern. —*Beng.*—Gamari ; *Hind.*—Kumbhár ; *Sans.*—Gambhar ; *Tam.*—Gumudu téku ; *Tel.*—Gúmar tek ; *Bom.*—Shewun.

A large tree, common on the Lower Himálaya and in Burma. Natural order *Verbenaceæ*.

Medicinal uses.—The ROOT is an ingredient of the *dasamula*, a compound decoction of ten plants in great repute among Hindú physicians. It is employed as a bitter tonic, stomachic and laxative. The young LEAVES are demulcent. The ROOT of *G. asiatica* (Hind., *Badhára*) is also used as a demulcent, chiefly in gonorrhœa and catarrh of the bladder. The BARK is used in the Madras Presidency to assist the fermentation of toddy.

GOSSYPIUM HERBACEUM.

THE COTTON PLANT.

Vern.—*Beng.*—Kapás, Tula; *Hind.*—Ruí, Kapás ; *Sans.*—Karpas; *Guz.*—Ru; *Burm.*—Wah; *Bom.*—Rui, Kapás.

Various species of the cotton plants, natural order *Malvaceæ*, are extensively cultivated in India, several hybrids

of *G. herbaceum* being common in Sind and in many places throughout the Eastern and Western Peninsula. The hairs of the seed cleaned and purified constitute the cotton of commerce, Indian cotton being exported, chiefly from Bombay, to a very large extent and forming a considerable proportion of the world's supply.

The OIL (Cotton-seed Oil) expressed from the seed after removal of the "floss" or cotton, to the extent of 20 or 25 per cent., is an important vegetable oil largely consumed in England and in America. The value of the seed as an article of export is at present almost entirely neglected by Indian cotton cultivators, although the trade has assumed immense proportions in America where the oil is used in a large variety of industrial applications.

Cotton-wool is composed of almost pure *cellulose*. It is used in the preparation of gun-cotton or pyroxylin which in turn is the source of collodion.

Medicinal uses.—Cotton SEEDS are laxative, demulcent, expectorant and aphrodisiac, they are employed to reduce the pain of the testes during 'moon fever,' an affection peculiar to India. The herbaceous part of the plant is demulcent. The bark of the ROOT is also medicinal, and is used in the United States in place of ergot in dysmenorrhœa. The OIL being partly a drying and partly a non-drying oil is not suited for pharmaceutical purposes.

GREWIA ASIATICA.

Vern.—*Beng.* and *Hind.*—Phalsá; *Sans.*—Parusha; *Guz.*—Phalsa; *Tel.*—Putiki; *Bom.*—Phalasi.

A moderate-sized tree belonging to the natural order *Tiliaceæ*, and found throughout India. The small acid FRUIT is much esteemed by the people of India. A

sherbet is made from it, and a spirit is also distilled after fermentation.

Medicinal uses.—The tree is cultivated for the FRUIT, which is one of the *phala-traya* or fruit-triad of Sanskrit writers (see *Punica Granatum*, the pomegranate), and possesses astringent and cooling properties. The BARK contains a mucilaginous juice, and the infusion is used as a demulcent.

GUIZOTIA ABYSSYNICA.

NIGER SEED : KERSANÍ SEED.

Vern.—*Beng.*—Rám-tíl, Surguja ; *Hind.*—Kala-tíl ; *Tel.*—Valesulú ; *Bom.*—Kerani, Kersaní.

An annual herbaceous plant, a member of the *Compositæ*, cultivated in many parts of India, chiefly in Bengal, Bombay and the Deccan. The seeds yield on expression a fixed sweet OIL, somewhat allied to the *tíl* or sesame oil, and sometimes sold as a lower grade of that product.

The OIL is employed in cooking and for anointing the body, and it may be used in place of sesame or olive oils. It is frequently employed in India as an adulterant of more valuable oils.

GYMNEMA SYLVESTRE.

Vern.—*Beng.* and *Hind.*—Méra-singí; *Sans.*—Meshasringi; *Tam.*—Shiru-kurunja ; *Tel.*—Poda-patra ; *Bom.*—Kavalí.

A shrubby climbing plant, natural order *Asclepiadeæ*, common in Central and Southern India and on the Western side, plentiful about Bombay. The ROOT has long been held in great repute by the Hindús as a remedy for snake-bite,

the powder being dusted upon the wound and a decoction given internally. The LEAVES have the remarkable property when chewed of deadening the sense of taste to sweet and bitter substances, a property which it has been suggested might be utilized in disguising the taste of nauseous and bitter medicines.

A careful analysis of the leaves by Hooper has revealed the presence of a glucoside which he has named *Gymnemic Acid.* It forms more than six per cent. of the composition of the leaves in combination with a base which is inorganic. It is related in some particulars to glycyrrhizic acid, but having some distinctly peculiar reactions and having the anti-saccharine properly alluded to. Tartaric acid and a neutral principle were also found to be present.

GYNANDROPSIS PENTAPHYLLA.

CARAVELLA SEEDS.

Vern.—*Beng.*—Hurhuria, Sádá-hurhuria ; *Hind.*—Hurhur ; *Sans.*—Arkapushpika, Surjavarta ; *Tam.*—Velai ; *Tel.*—Velakura ; *Mal.*—Kara-vélá.

A common annual on cultivated ground in the warmer parts of India. Natural order *Cappariderœ.* The small kidney-shaped black seeds are frequently confused with those of *Cleome viscosa* which they resemble except that they are rougher externally. The whole plant has an odour somewhat resembling black currant leaf, and when crushed in the fresh state yields an acrid essential OIL resembling that of garlic or mustard.

Medicinal uses.—The powdered SEEDS, in doses of about 30 grains, are anthelmintic, and the juice of the LEAVES is used occasionally for earache and otorrhœa, and other affections of the ear.

GYNOCARDIA ODORATA.

CHAULMUGRA.

Vern.—*Beng.*—Chaulmúgra, Petarkura; *Hind.*—Chalmúgra; *Lepcha.*—Túk-kung; *Bom.*—Chaulmugra; *Pers.*—Birinj-mógrá.

An evergreen tree belonging to the natural order *Bixineæ*. It grows on the Lower Himálaya, abounding in Sikkim, and extends to Rangoon and Chittagong. The rough-skinned hard, round seeds, about an inch or less in diameter, three or four of which are contained in each fruit growing on the stem and main branches, yield on cold expression about 30 to 35 per cent. of a fixed OIL, of a light brown colour when fresh and peculiar odour, with a specific gravity of ·95 at 90° F., solid and unctuous under 60°F. Chaulmúgra oil, as obtained in the bazár in Calcutta, is of a more or less dark colour, thick, obtained by hot expression, usually adulterated, and containing a whitish granular deposit of its fatty constituents. The oil has long had a great reputation in India as a remedy for leprosy, and it has been used with considerable success in European practice for cutaneous diseases, having been extensively tried in several of the London hospitals. The active constituent is *Gynocardic Acid*, besides *Palmitic*, *Hypogœic* and *Cocinic Acids*, the acid, burning taste of the oil being due to the first-mentioned body. Mr. David Hooper has found the proportion of palmitic acid present in pure oil to be very large and stearic acid absent.

Medicinal uses.—The OIL is a valuable external stimulating application in psoriasis, acute and chronic eczema, syphilitic eruptions, leprosy, and the like, and in rheumatism and rheumatic gout. Its action is usually enhanced by its alterative action administered internally in doses of

5 or 6 minims in emulsion or in milk or cod-liver oil, preferably in capsules, gradually increased to 30 minims. It has been used successfully in phthisis, employed internally; and externally to the chest. Gynocardic acid may also be given internally in doses of $\frac{1}{4}$ to $\frac{1}{2}$ grain. Magnesium Gynocardate has lately been tried with some success in leprosy. The magnesia salt is said to agree better than the oil and to be applicable with equal advantage. The best external preparation is an ointment prepared with lanoline. From evidence recorded in connection with the Leprosy Commission in India (1890-91), it appears that the action of Chaulmúgra oil in leprosy, though at the best palliative, is nevertheless more marked than that of Gurjun oil (*Dipterocarpus*, q. v.). It was considered probable that a prolonged and regular use of the oil might in some cases arrest the progress of the disease, though for how long was still doubtful.

Substitutes.—The seeds of the allied *Hydnocarpus Wightiana* yield an oil which is sometimes used in place of that of the Chaulmúgra. *Lukrabo* seeds, an article of commerce in China, also allied to Chaulmúgra, is regarded as a false variety of the drug. It is referred to *Hydnocarpus*, and is known in China as *Ta fung-tsze*, where the oil has been used as an application in leprosy for centuries.

HARDWICKIA PINNATA.

Vern.—*Tam.*—Sampirani; *Mal.*—Shurali; *Tinnevelly.*—Kolavu.

A large tree growing on the ghauts of Kanara, Travancore and the Karnatic. Natural order *Leguminosæ*. An Oleo-Resin is obtained from the wood which closely

resembles in its appearance and properties that obtained from different species of *Dipterocarpus* (q. v.), or gurjun trees.

Medicinal uses.—The OLEO-RESIN has properties resembling those of copaiba, for which it may be found to be a useful substitute.

HEDYCHIUM SPICATUM.

Vern.—*Beng.* and *Hind.*—Kapúr-kachri, Sit-ruti; *Sans.*—Kapurakáchali; *Bom.*—Kapúr-kachri.

Natural order *Scitamineæ*. A tree common in the Punjáb, Himálaya and Nepal. The aromatic root stocks are an article of some commercial importance in India, as an ingredient of the *abir* perfumed red powder largely used by the Hindús in the *holi* religious festival. In the bazárs *Kapúr-kachri* is found in round slices, usually ½ inch or less in diameter, whitish and starchy, with an aromatic odour somewhat resembling orris and pungent bitter taste.

Medicinal uses.—The RHIZOME has aromatic, stomachic, and stimulant properties.

HELIANTHUS ANNUUS.

THE SUNFLOWER.

Vern.—*Beng.*—Surjya-múkhi; *Hind.*—Surajmúkhí; *Sans.*—Suriya-mukhi; *Pers.*—Guli-aftab.

This annual plant, natural order *Compositæ*, with its large, coarse, yellow flowers is common in Indian gardens. The SEEDS yield on expression an OIL which may be employed in culinary and industrial purposes.

HELIANTHUS TUBEROSUS.

THE JERUSALEM ARTICHOKE.

Vern.—*Beng.*—Brahmoka ; *Hind.*—Hattichók.

The tuberous ROOTS of this plant, natural order *Compositæ*, cultivated in gardens, are sometimes recommended as a nutritious article of diet to invalids in preference to the potato tuber. The rapid growth of the plant has been taken advantage of to purify the air in malarious districts.

HELICTERES ISORA.

THE INDIAN SCREW TREE.

Vern.—*Beng.*—Antmorá ; *Hind.*—Morarphali; *Sans.*—Awartani; *Tam.*—Valumberí ; *Tel.*—Kavanchí ; *Guz.*—Mriga-shinga ; *Pers.*—Kisht-bar-kisht.

A shrub, belonging to the natural order *Sterculiaceæ*, common in Central and Western India. The FRUITS, consisting of spirally twisted carpels, are very common in the drug bazárs, and have long been a popular medicine with the Natives. They have been employed chiefly in intestinal disturbances, colic and the like, the medicinal virtues ascribed being largely fallacious and probably traceable to the doctrine of signatures in allusion to the twisted shape of the intestines.

HELIOTROPIUM INDICUM.

HELIOTROPE.

Vern.—*Beng.*—Hatisura ; *Hind.*—Hatta-jurí.

A small fragrant plant, natural order *Boragineæ*, common in many parts of India.

Medicinal uses.—The juice of the LEAVES is used as an application to boils and to the bites of scorpions and stings of insects.

HEMIDESMUS INDICUS.

INDIAN SARSAPARILLA.

Vern.—*Beng.* — Anantamul ; *Hind.* — Magrabu, Hindí-sálsá ; *Sans.*—Anantá, Sariva ; *Tam.*—Nannári ; *Tel.*—Gadisugandi ; *Bom.*—Uparsára ; *Pers.*—Aushbahe-hindi.

A climbing plant, of the natural order *Asclepiadeæ*, plentiful throughout Northern India, common in Bengal and extending to Travancore and Ceylon. It is also found in the Bombay Presidency. It is met with in commerce in small bundles consisting of the tortuous ROOTS and rootlets of one or more plants bound together with a wisp of the stem. The individual roots are several feet long; the vernacular name *anantamul* being derived from the Sanskrit "endless root," from ¼ to ¾ inch in diameter, with numerous transverse cracks when dry, with a sweetish taste and a faint odour when fresh or dry resembling that of Tonquin bean.

Hemidesmus root and a syrup prepared from it were made official in the *British Pharmacopœia* of 1864, and it was also included in the *Pharmacopœia of India.* It was believed to possess properties allied to those of sarsaparilla. This has not even yet been fully established, but it is perhaps at least equal in medicinal value to that drug. The chemical constitution of the root has not been fully determined, but its flavouring principle is a derivative of coumarin.

Medicinal uses.—Hemidesmus, usually prescribed in the form of syrup, is believed to have demulcent, mild alterative and diuretic properties. It is not largely employed in

European practice, but is prescribed to a considerable extent by Native physicians at least in Calcutta, usually as a vehicle for the more active potassium iodide, for the same purposes as sarsaparilla.

HERMODACTYLUS.

See COLCHICUM.

HERPESTIS MONNIERA.

Vern.—*Beng.*—Brahmi, Adha-bírní; *Hind.*—Barambhi, Safed chamni; *Sans.*—Brahmi; *Tam.*—Nir-brami; *Tel.*—Sambrani chettu; *Bom.*—Bama.

A small annual creeping plant, natural order *Scrophularineæ*, found in the tropical regions of both hemispheres.

Medicinal uses.—The *brahmi* of ancient Sanskrit *Materia Medica* was regarded as a remedy in insanity and epilepsy, the whole PLANT, including the ROOT, being employed. The virtues ascribed were probably fallacious, and it is questionable whether the plant under notice yields the corresponding drug. In Bombay the plant *Hydrocotyle asiatica* is known under the name of *brahmi*. It is now employed as a diuretic.

HIBISCUS ABELMOSCHUS.

Syn.—ABELMOSCHUS MOSCHATUS.

THE MUSK MALLOW.

Vern.—*Beng.* and *Hind.*—Mushk-dana, Kasturi-dáná, Latá-kasturi; *Sans.*—Latakasturika; *Tam.*—Kattuk-kastúri; *Tel.*—Kasturi-bendavittulu; *Bom.*—Miskh-dána.

A herbaceous annual, natural order *Malvaceæ*, grown in many parts of India for its fibre, common in Bengal and found in most tropical regions. The brown, kidney-shaped

SEEDS, known as *mushk-dana*, are readily obtainable in the bazárs. They have a faint odour resembling musk or musk and amber, hence the name. They are used to some extent in perfuming medicinal oils. The seeds of this plant are known as *grains d'ambrette* (musk seeds.) They are little used, and are not now exported from India.

Medicinal uses.—The SEEDS are aromatic, tonic, and carminative, used in nervous disorders, debility and hysteria in place of musk, which is much prescribed in India in these affections. The tincture is an efficient preparation.

HIBISCUS ESCULENTUS.

Syn.—ABELMOSCHUS ESCULENTUS

THE EDIBLE HIBISCUS : OKRO.

Vern.—*Beng.*—Dhenras, Dhéras ; *Hind.*—Ram-turai, Bhindi ; *Sans.*—Gandhamula; *Tam.*—Vendaikkay; *Tel.*—Vendakaya ; *Pers.*—Bámiyah ; *Bom.*—Bhenda.

A tall herbaceous annual, belonging to the *Malvaceæ*, naturalised in all tropical countries. It is much esteemed in India for its FRUIT, which in the unripe state is edible and nutritious, abounding, as does the whole plant, in insipid mucilage, consisting chiefly of *pectin* and starch, a common feature of many members of this order. The fruit is known as "ladies' fingers," and is largely used both by Europeans and Natives. The fresh immature PODS or capsules and a decoction are official in the *Pharmacopœia of India*. The mucilage contained in the fruits is believed to be identical with that of *Althæa*.

Medicinal uses.—The decoction administered internally is emollient, demulcent and diuretic in catarrhal affections. Externally the LEAVES form a useful emollient poultice.

HIBISCUS ROSA-SINENSIS.

Vern.—*Beng.*—Jaba; *Hind.*—Jasut; *Sans.*—Jaba; *Bom.*—Jasavanda.

Common in flower-gardens in India. The expressed juice of the dark red PETALS of this *Malvaceous* species communicates a bluish purple tint to paper which turns red with acid, forming a compound similar to that formed with litmus. The other parts of the plant are demulcent.

HIBISCUS SUBDARIFFA.

ROZELLE OR RED SORREL.

Vern.—*Beng.*—Mestá, Patwa; *Hind.*—Lál-ambári; *Bom.*—Lal-ambari.

Largely cultivated for its fibre in many parts of India. This plant also possesses the emollient demulcent qualities common to the *Malvaceæ*, the seeds being used medicinally. These properties are combined in this plant with a certain amount of acidity which has a tendency to prevent oppression of the stomach during the administration of the mucilaginous decoction. The FRUIT has valuable antiscorbutic properties.

HIRUDO MEDICINALIS.

THE LEECH.

Vern.—*Beng.*—Jónk; *Hind.*—Jók, Jónk; *Sans.*—Jalaka; *Tam.*—Attai; *Tel.*—Attalu; *Bom.*—Jala.

Leeches have been employed by the Hindús from a very remote period. They belong to the natural order *Hirudineæ* and family *Gnathobdellideæ*. Twelve species of Indian leeches, six of which are said to be venomous and six useful, are described in Sanskrit writings.

They are found in abundance, during the wet season or monsoon, in marshes and around the edges of tanks in several places in Bengal, the Punjáb and North-West Provinces. They are collected at Baraset, Delhi, and in the neighbourhood of Patiala, usually by men who go into the water and allow the animals to attach themselves to their legs.

Medicinal uses.—Leeches are employed for local abstraction of blood, in cases of congestion and in cases of internal inflammation.

HOLARRHENA ANTIDYSENTERICA.

Syn.—WRIGHTIA ANTIDYSENTERICA.

THE KURCHI: CONESSI OR TELLICHERRY BARK.

Vern.—*Beng.*—Kurchi; *Hind.*—Karchi, Kureyá, Dudhi; *Sans.*—Kutaja, Kalinga; *Tam.*—Veppalei; *Bom.*—Pandhra-kura; *Pers.*—Indar-javi-talkh.

(The Seeds)—*Beng.* and *Hind.*—Indrajab, Titá-indrajao; *Sans.*—Indrayava; *Tam.*—Kulappalai-virai; *Bom.*—Karvá-indrajou.

A small tree common in the forests of India, indigenous to the tropical Himálaya. It belongs to the natural order *Apocynaceæ*. The BARK of the stem and root, preferably of the young plants, and the SEEDS, which are known in the bazárs by distinctive names, as above, have attained a well deserved reputation both in Indian and European medical practice as remedies in acute and chronic diarrhœa and dysentery. The author has advocated the bark being made official in the *British Pharmacopœia*.

The bark contains an alkaloidal principle which has been named *Conessine* and *Kurchiene*, and which has been employed medicinally.

Medicinal uses.—Astringent, antidysenteric, febrifuge, and anthelmintic. The best preparations of *kurchi* are

the solid and liquid extracts and the decoction. *Indrajao* is used in the form of powder. Both drugs may be advantageously combined with other astringents.

Substitute.—The bark of *Wrightia tinctoria* has very frequently been confused with that of the true *kurchi*. It is comparatively inert, and the fact of its having been substituted probably accounts for the drug under notice having fallen to some extent into disrepute. The false bark may be easily distinguished by being reddish brown and smooth as compared with the genuine which is thicker and of a dirty white and buff colour, the former being much less bitter to taste. The seeds of the two plants are similarly confused, those of *Wrightia* are known as *Indrajao shirin* and those of *H. antidysenterica* as *Indrajao talkh*.

HOLIGARNA LONGIFOLIA.

THE BLACK VARNISH TREE.

Vern.—*Beng.*—Barola; *Bom.*—Bibu, Húl-geri, Kalu-geri; *Mal.*—Charei, Karun-charei; *Burm.*—She-che.

A common tree in the Madras Presidency and Travancore, found also in Eastern Bengal, Chittagong and Pegu. It belongs to the *Anacardiaceæ*, and in common with several members of that order exudes a black, resinous, acrid and poisonous juice from the trunk and rind of the fruit. This secretion is of a powerfully caustic nature and blisters the skin when brought into contact with it. It is used by painters as a lacquer varnish.

The blistering principle as contained in the pericarp of the fruit has recently been investigated by Hooper * and found to be *Anacardic Acid* and an acrid oily substance

* *Pharmaceutical Journal*, 29th June 1895.

identical with cardol, the constituents being practically the same as those of the seeds of two other trees of the same natural order—*Anacardium occidentale* (the cashew-nut, q. v.) and *Semecarpus Anacardium* (the marking-nut, q. v.)

The *Holigarna* varnish is not known to be employed medicinally.

HOPEA ODORATA.

ROCK DAMMAR.

Vern.—*Burm.*—Théngan; *Andam.*—Rimda.

A large tree in Burma, and in the Andamans, growing abundantly, natural order *Dipterocarpeæ*. It yields a clear fragrant resin closely allied to dammar. It forms with turpentine or benzene a water-white durable varnish.

HORDEUM VULGARE.

BARLEY.

Vern.—*Beng.*—Jab; *Hind.*—Jav, jaoa; *Sans.*—Yava, Situshúka; *Tam.*—Barlhi arisí; *Tel.*—Pachcha yava; *Pers.*—Jao.

This cereal, natural order *Gramineæ*, is largely cultivated in several varieties in each of the Provinces of India. The dried SEED divested of its integuments is the *Hordeum decorticatum* of the Pharmacopœias. Barley contains starch and nutritive constituents resembling those of wheat and in addition three per cent. of fixed oil. It contains a large amount of nitrogenous matter which makes it specially suitable as an invalid's food in form of powder. The partially germinated and dried grain is the source of MALT extract which is prepared by aqueous extraction and evaporation *in vacuo*. It consists chiefly of dextrin and malt sugar (maltose) and contains the ferment, *Diastase*,

which is developed during the malting process, and which possesses the power of converting starch into dextrin and sugar, thus assisting in the digestion of starchy or farinaceous foods.

Medicinal uses.—A decoction of barley forms a demulcent nutrient drink (barley water) which may be given *ad libitum*. It may be improved by the addition of lemon flavouring and sugar. Malt extract has become extremely popular as a nutritive and demulcent, and a valuable vehicle for other medicines, especially cod-liver oil with which it forms a palatable combination.

HYDRARGYRUM.

MERCURY.

Vern.—*Beng.* and *Hind.*—Párá ; *Sans.*—Rasa, Párada.

Compounds of mercury have been used in Hindú medicine for many centuries chiefly for the same diseases as those for which they are employed in modern medicine. The methods of purification and preparation carried out by the *hakíms* were peculiarly Indian, and need scarcely be recorded here since the mercurials may be easily obtained in a pure and more efficient state. The preparations in use at the present time among Native practitioners, with their Bengali names, are:—The perchloride (*rasa-karpura*), which is really a mixture of the perchloride and chloride (calomel), cinnabar (*hingúl, shingraf*), and the black sulphide (*kajjali*). As found in the bazárs these substances are impure, and it is not advisable to substitute them for the imported article. The medicinal uses of the mercurials are generally alterative. A combination of mercury and sulphur prepared by the *kavirajs* and carefully sublimed is known as *rasa-sindúr*, and is one of the chief remedies

in their hands as an alterative. Unlike other preparations of mercury it does not readily cause salivation. Another preparation, of mercury and gold, known as the *makaradhwaja*, is considered highly beneficial for all kinds of constitutional diseases, and as a remedy for renovating the system when broken down by long ill-health.

HYDROCOTYLE ASIATICA.

INDIAN PENNYWORT.

Vern.—*Beng.*—Thol-kuri; *Hind.*—Khulakhudi, Brahmamanduki; *Sans.*—Mandukaparni; *Tam.*—Vallárai; *Bom.*—Karinga.

A common *Umbelliferous* weed in Bengal and nearly all over India, plentiful around Calcutta near tanks and other moist places. The fresh plant has a faint, aromatic odour when crushed, somewhat resembling ivy, which it loses on drying. The LEAVES are reniform, ½ to 1½ inch in diameter on thin short stalks. They were made official in the *Pharmacopœia of India*, but the whole plant may be used medicinally, the ROOT being believed to be the most active part. The constituents are oily and resinous, together with mucilaginous principles and tannin. They have been named collectively *Vellarin*, derived from the Tamil name of the plant.

Medicinal uses.—An alterative, tonic, and reliable local stimulant. Its efficacy as an internal and external remedy in ulcerations, eczema, leprosy, and other cutaneous affections has been fully demonstrated. The fluid extract of the fresh plant may be administered internally in doses of 1 to 5 minims. When this dose is largely exceeded, it acts as an irritant poison. Externally the official powder of the dried LEAVES for dusting on affected surfaces or the poultice

of the fresh leaves have marked stimulating and healing action. A better external preparation is an ointment prepared with lanoline containing one drachm of the liquid extract in each ounce. In elephantiasis, enlarged scrotum and affections of the cellular tissues this ointment may be found efficacious, while the internal administration of the liquid extract will be found to check the periodic fever called in India 'moon-fever' associated with these affections.

HYGROPHILA SPINOSA.

Syn.—ASTERACANTHA LONGIFOLIA.

Vern.—*Beng.*—Kuliákhárá; *Hind.*—Tálmakhana; *Sans.*—Kokiláksha, Ikshughandhá; *Tam.*—Nirmulli; *Bom.*—Talimkhana.

A common herb in India and Ceylon. Natural order *Acanthaceæ*. A principle has been isolated from the ROOTS which has been found to be a *Cholesterol*, this fact having been fully confirmed by Drs. C. J. H. Warden and C. L. Bose.

Medicinal uses.—This PLANT was recognised as cooling and diuretic by Sanskrit writers. The ROOTS, LEAVES and SEEDS are still regarded as demulcent and diuretic and indicated in diseases of the genito-urinary tract and in dropsical affections. The seeds are chiefly employed and are easily obtainable in most bazárs.

HYMENODICTYON EXCELSUM.

Vern.—*Hind.*—Bhaulan, Dhau li, Ba ndárú; *Tel.*—Bandáru *Bom.*—Kala-kurwah, Ral a-kadu.

A large tree belonging to the natural order *Rubiaceæ* (tribe *Cinchoneæ*) found on the Western Himálaya, in the

Central Provinces and the Deccan and at Chittagong. Like that of some cinchonas the bark has an inner coat of a reddish colour containing a bitter astringent principle. This was investigated some years ago by Mr. W. A. H. Naylor and found to consist of an crystallizable alkaloid which he named *Hymenodictyonine*, together with a bitter neutral principle, the former being somewhat analogous in its chemical properties to those of nicotine.

Medicinal uses.—The BARK is intensely bitter, febrifuge, antiperiodic, and astringent. It has long been known in Hindú *Materia Medica*, but it is little used at the present time.

HYOSCYAMUS NIGER.

HENBANE.

Vern.—(The Plant) — *Beng.*—Khorasaní-ajowan ; *Hind.*—Khurá-sání-ajwán ; *Sans.*—Párasikaya ; *Bom.*—Khorasani, ajowa ; *Tam.* — Kurasani-omam ; *Tel.* — Kurashani-vámam ; *Pers.*—Bazrulbang. (The Seeds)—*Beng.* and *Hind.*—Bazrúl.

This valuable medicinal plant, natural order *Solanaceæ*, grows wild in great abundance throughout the Himálayan range at altitudes varying from 8,000 to 11,000 feet. It has also been cultivated successfully in India at the Botanical Gardens of Saharanpur, Poona and Calcutta, chiefly for the use of Government Medical Stores, although the indigenous drug is not at present used at the latter centre. It is remarkable that, as in the case of belladonna, while each of these drugs is plentiful and not inaccessible, practically the whole of the hysocyamus used in India should continue to be imported. The plant, as found in the temperate Himálayan region, may be regarded as practically identical in its chemical constituents with that cultivated for the drug

markets of the world, and the more general standardization of pharmaceutical preparations would overcome the variations which must be inevitable in plants grown even under the same conditions in varying seasons. Even the seeds as sold in the bazárs under the above name are imported from Persia and Afghanistan, and are believed to be those of *H. albus*. Of cultivated henbanes the second year's growth of the *biennial* plant has usually been preferred, although it has been found that the first year's growth may be equal in alkaloidal value. The active principle, which resides mainly in the SEEDS and is also contained in the LEAVES and green FLOWERING TOPS, is *Hyoscyamine*, one of the three mydriatic alkaloids (Atropine, Hyoscyamine or Daturine and Hyoscine). It is isomeric with atropine into which it can be converted. It may be split up into *Hyoscine* (said to be isomeric with cocaïne) and *Hyoscinic Acid*. Hyoscine is a volatile oily liquid about five times more powerful therapeutically than hyoscyamine. The seeds contain in addition about 25 per cent. of a thick yellow fixed OIL. The fresh LEAVES and FLOWERS and FLOWERING TOPS and the dried LEAVES and FLOWERING TOPS are official in the *British Pharmacopœia*. From the fresh plant an extract and juice are prepared, and the tincture is made from the dried herb.

Medicinal uses.—Sedative, anodyne, antispasmodic and stimulant, mydriatic (dilating the pupil of the eye). Its effects are milder than those of belladonna. Hyoscyamus is largely prescribed in mental excitement, insomnia, palpitation connected with debility and hysteria. It has a peculiarly sedative effect in affections of genito-urinary organs, particularly cystitis, and is given with advantage in this class of cases. The alkaloids and their salts are frequently administered hypodermically.

HYPECOUM PROCUMBENS.

THE HORNED CUMMIN.

A low annual weed belonging to the *Fumariaceæ* found in Sind, Afghanistan, and the Punjáb salt range.

Medicinal use.—The plant has been noticed on account of its JUICE, which is said to resemble opium in its properties.

HYSSOPUS OFFICINALIS.

THE HYSSOP.

Vern.—*Hind.*, *Arab.* and *Pers.*—Zufah-i-Yábis.

The true hyssop is to be found on the Himálaya: natural order *Labiatæ*. The herb is occasionally met with in the Native drug shops, but it is considered doubtful whether *Zufah-i-Yábis* is the true hyssop.

Medicinal uses.—Formerly regarded as tonic, stimulant and deobstruent. It is only occasionally used by herbalists.

ICHNOCARPUS FRUTESCENS.

Vern.—*Beng.*—Syama latá; *Hind.*—Dudhi-latá, Siama latá; *Sans.*—Sárivá; *Burm.*—Tansapai.

A climbing plant of the *Apocynaceæ*, widely distributed from the Western Himálaya to Bengal, Burma, the Southern part of the Bombay Presidency, South India and Ceylon.

Medicinal uses.—The ROOT is regarded as analogous in its properties to that of *Hemidesmus indicus*, and is often used as country sarsaparilla in the treatment of skin eruptions. The STALK and LEAVES are in common use, in the form of decoction, in simple fever.

IMPATIENS SULCATA.

A species of Balsam, natural order *Geraniaceæ*, often 15 feet in height, frequent on the temperate Himálaya. Dr. Watt records having found a dense growth of this plant in Kulu which formed an almost impenetrable mass. On endeavouring to push his way through it the seeds shot off in every direction so that it was almost impossible to open the eyes. He found that the SEEDS were regularly eaten, and that an OIL was extracted from them which is regarded as of special merit, but the exact properties of which have not yet been ascertained.

INDIGOFERA TINCTORIA.

THE TRUE INDIGO.

Vern.—*Beng.* and *Hind.*—Níl; *Sans.*—Níla; *Bom.*—Nila; *Guz.*—Gali; *Sind.*—Níl; *Tam.*—Nilam; *Tel.*—Nili-mandu; *Pers.*—Nílah.

An erect shrub of the *Leguminosæ*, not usually more than two or three feet high, found wild and cultivated extensively in India for the valuable dye-stuff which it yields, chiefly in Bengal, in the delta of the Ganges, also in Madras, Sind and Bombay. Bengal indigo forms a most important article of Indian export, although the discovery of aniline dyes has somewhat affected it. The process of indigo manufacture as followed by planters in India consists essentially of allowing the fresh green plant to ferment in large vats in the presence of water, the resulting yellow liquor being run off, and the *Leucindigo* or indigo-white, produced from the glucoside *Indican* (which is present in the plant) being oxidized by the introduction of air

with which it is vigorously mixed. The oxidized product—chiefly *Indigotin* or indigo-blue—settles to the bottom and is carefully collected, washed, and pressed into cakes which are then cut into cubes of 3 or 3½ inches square and finally dried. The yield of indigo is sometimes as much as 50 per cent. Indigotin is insoluble in water, alcohol and dilute acids; it is soluble in strong sulphuric acid forming the compound "sulphate of indigo" or "extract of indigo" which is employed as a chemical test, the colour of indigo being destroyed by free chlorine and hypochlorates. Indigotin has been prepared artificially.

Medicinal uses.—The LEAVES and indigo have been used in hepatitis, epilepsy, and other nervous affections. The plant is popularly regarded in some parts as a preventive of hydrophobia, administered internally in infusion, and the juice applied externally to the part bitten.

IONIDIUM SUFFRUTICOSUM.

Syn.—VIOLA SUFFRUTICOSA.

Vern.—*Beng.*—Núnbora; *Hind.*—Ratanpurs; *Sans.*—Chárati; *Tam.*—Orilai támarai; *Tel.*—Suryakánti.

A small herbaceous plant, belonging to the natural order *Violaceæ*, found in many parts of India from Agra to the Southern Provinces. Among other constituents it yields *Quercitrin* allied to *Viola-quercitrin* contained in some species of the *Violaceæ*. *See* also *Viola odorata.*

Medicinal uses.—The LEAVES and tender STALKS have been regarded as demulcent, tonic and diuretic, administered in decoction and confection and in powder in doses of 20 to 60 grains.

IPOMÆA DIGITATA.

Vern.—*Beng.*—Bhuin-kumrá ; *Hind.*—Bilai-khand ; *Sans.*—Vidári ; *Bom.*—Bhui kohala ; *Tel.*—Matta pal-tiga.

A plant with large tuberous roots, natural order *Convolvulaceæ*, indigenous to the hotter parts of India and largely cultivated as an ornamental plant.

Medicinal uses.—The ROOT is regarded as tonic, alterative, aphrodisiac and lactagogue. The roots of a smaller variety are known in Bombay as *asgand*, and used for the same purposes as the above.

IPOMÆA HEDERACEA.

Syn.—PHARBITIS NIL.

THE KALA-DANAH.

Vern.—*Beng.* and *Hind.*—Kalá-dána, Mirchai ; *Bom.*—Kalá-dánah ; *Mad.*—Kala-zirki ; *Tam.*—Kodi-kakkatanvirai ; *Tel.*—Kolli-vittulu ; *Arab.*—Hab-un-níl ; *Pers.*—Tukhm-i-níl.

The *Convolvulaceous* plant yielding the *kalá-dána* seeds is found wild in some parts of India and cultivated in several places. The SEEDS have long been known in India as an efficient cathartic closely allied to jalap, and an extract, tincture, compound powder and resin were made official in the *Pharmacopœia of India*. The active principle is a pale yellowish resin, *Pharbitisin*, existing to the extent of about 8 per cent., somewhat resembling resin of jalap (*Convolvulin*) and corresponding to that body in its chemical characters.

Another drug of a similar nature met with in the bazár at Patna and surrounding districts and brought to Calcutta,

is the *Shapussundo,* formerly also called *lál-dána* on account of its brownish red colour which distinguishes it from the black or *kalá-dána.* The seeds, unlike those of *I. hederacea,* are covered with minute soft hairs, so that although the author originally attributed them to an undetermined species of *Ipomœa,* this is probably incorrect.

Medicinal use.—The SEEDS are a reliable purgative resembling in action that of jalap, and have been used as such to a considerable extent in several charitable dispensaries. The dried and powdered seeds may be administered in doses of half to one drachm either alone or in combination with cream of tartar and ginger. The resin is given in doses of 2 to 8 grains.

IPOMÆA PURGA.

JALAP.

The true jalap, natural order *Convolvulaceæ,* is successfully cultivated on the North-West Himálaya, at Mussoorie and on the Nilgiris near Ootacamund, where the greater part of the supplies of the drug for the Medical Stores Department at Madras are grown. The dried roots or tubercules of well-matured plants give an equal yield of the active resinous principles with the best jalap imported from Mexico and South America. *Resina Jalapæ* of the Pharmacopœias is a pale brown powder. It contains two glucosidal resins, which have been named *Convolvulin* and *Jalapin.* Jalapin of pharmacy is the purified decolorized resin of jalap, in whitish amorphous powder.

Medicinal use.—Jalap is well-known as a hydragogue purgative.

IPOMÆA TURPETHUM.

TURPETH ROOT : INDIAN JALAP.

Vern.—*Beng.*—Teori, Dhud ; *Hind.*—Pitohri, Nisoth, Tarbud ; *Sans.*—Trivrit ; *Bom.*—Nishotar, Phutkari ; *Tam.*—Shivadai ; *Tel.*—Tégada ; *Arab.*—Turbund.

A perennial plant growing wild nearly all over India. The ROOT and ROOT-BARK of "white turpeth" are obtainable in the bazárs, and are in common use by Native practitioners as a cathartic, a darker variety known as "black turpeth" being avoided as too drastic in its properties. The ROOT-BARK only is to be relied upon as medicinal, much disappointment having been caused by the employment of the inert stem and root in European practice. It has been suggested by Mr. T. N. Mukharji that the substitution of the root of *Ipomœa bona-nox*, which is not readily distinguishable when dry from that of *I. turpethum*, may account for this to some extent. The root-bark contains 4 per cent. of a brownish yellow glucosidal resin 95 per cent. of which is *Turpethin*. The root contains a volatile oil and yellow colouring matter.

Medicinal uses.—Cathartic and laxative, resembling jalap in its action. The dried and powdered ROOT-BARK is best administered in doses of ½ to 1½ drachm, in combination with ginger and cream of tartar as in compound jalap powder.

IRIS FLORENTINA.

ORRIS ROOT.

Vern.—*Hind.*—Irsa, Irisa ; *Pers.*—Beg-i-banfsa (violet root).

This plant, natural order *Iridaceæ*, is cultivated in Kashmír and Kabúl. Orris ROOT is to be found in the bazárs of Calcutta under the name of *beg-banfsha*, with the brown bark adhering. Much of this is probably the

rhizome of *I. germanica*. It has not been ascertained whether it contains *Iridin*. Orris root contains an essential Oil, Otto of Orris, highly valued in perfumery.

Medicinal uses.—Orris root is occasionally used in native practice as deobstruent and diuretic. The powdered root enters largely as a fragrant ingredient into the composition of dentifrices.

JASMINUM GRANDIFLORUM.

The Spanish Jasmine.

Vern.—*Beng.*—Chámeli, Jati; *Hind.*—Játi; *Sans.*—Játi; *Bom.*—Chambelí.

This plant, belonging to the natural order *Oleaceæ*, is found on the temperate Himálaya. The Leaves and fragrant Flowers have long been known in Hindú medicine. From the flowers a perfumed Oil or Otto is prepared which is greatly esteemed. Otto of jasmine is largely used in India as a perfume, but it is for the most part imported, although the extraction of the oil by crushed sesamum seeds is carried on to some extent. An alkaloid, called *Jasminine*, has been isolated from the leaves.

Medicinal uses.—The Leaves are regarded as useful, administered internally in skin diseases. They have been known to heal ulceration in the mouth by simply chewing.

JASMINUM SAMBAC.

The Arabian Jasmine.

Vern.—*Beng.* and *Hind.*—Bal-phul, Motiya, Mogra; *Sans.*—Mallika; *Bom.*—Mogri; *Tam.*—Mallipu; *Tel.*—Boddu malle; *Pers.*—Zambak.

Another of the jasmine species cultivated in India, Burma and Ceylon. The flowers yield a fragrant essential Oil similar to that of *J. grandiflorum*.

Medicinal use.—The LEAVES are considered valuable in some parts as a lactifuge, the bruised leaves being applied to the breasts.

JATROPHA CURCAS.

Vern.—*Beng.*—Ban-bheranda, Gab-bheranda; *Hind.*—Jangli-arandi, Bag-berenda; *Sans.*—Kánana-eranda; *Bom.*—Moghli-erendi; *Tam.*—Kattámanaku; *Pers.*—Dandi-nahri.

An evergreen plant, cultivated chiefly for hedges in the Southern parts of India. Like the allied *Euphorbiaceous* plants, castor and croton, the SEEDS and OIL which this plant yields have purgative properties. The Oil is of lower specific gravity than that of castor oil, and does not appear to differ essentially in the nature of its constituents but in their relative proportion. The seeds are sometimes called "physic nuts." The action of both the seeds and oil is, however, very uncertain: they exhibit acrid and emetic properties, and have been known to be poisonous. The active principle of the oil has been named *Jatrophic Acid.* A recent research (A. Siegel, 1894) attributes the activity of the seeds to a poisonous toxalbumen analogous to ricin and named *Curcin.*

Medicinal uses.—In addition to the purgative properties mentioned above, which are only employed by the poorer classes of Natives in Southern India, the OIL is applied in itch, herpes and eczema. The milky JUICE which exudes from the stem is applied to wounds as a hæmostatic and forms a protecting film in the same manner as collodion.

JUGLANS REGIA.

THE WALNUT.

Vern.—*Beng.* and *Hind.*—Akhrôt; *Arab.*—Jouz; *Pers.*—Charmaghz.

A valuable timber tree, natural order *Juglandeæ,* wild in the Himálaya and largely cultivated in Afghanistan,

Kashmír and Western Thibet. The KERNELS of the cultivated varieties are edible and exported in considerable quantities to the plains. They contain about 50 per cent. of a clear fixed oil which is little used in India except by the hill tribes, where the walnut grows, who employ it as an illuminant and lubricant.

Medicinal uses.—The BARK of the tree is said to be used as an astringent and anthelmintic.

JUNIPERUS COMMUNIS.

THE JUNIPER.

Vern.—*Hind.*—Aarar; *Bom.*—Hab-ul-arar.

The juniper tree, natural order *Coniferæ*, is common on the North-West Himálaya. The wood is resinous and is used as incense. The FRUIT, commonly known as "juniper berries," is aromatic and terebinthinate, and a volatile OIL is distilled from it—"juniper berry oil,"—both of which are used in medicine. An oil is also distilled from the leaves and young twigs. The fruits also contain glucose and a bitter principle which has been named *Juniperine*. In Europe the berries are used to impart the peculiar flavour to gin.

Medicinal uses.—The FRUIT and OIL are carminative and diuretic, useful in dropsy and renal affections.

KÆMPFERIA ROTUNDA.

Vern.—*Beng.*—Bhuichámpá; *Hind.*—Bhui-champa; *Sans.*—Bhumichampaka.

A plant with round leaves and fragrant flowers, natural order *Scitamineæ*, found in India and Burma, often cultivated in gardens. The almost globular roots have

an aromatic, camphoraceous taste, somewhat resembling zedoary, with which they have been confounded.

Medicinal uses.—The fresh bruised TUBERS are in popular use in many parts of India as an application to wounds and bruises to reduce swellings.

KALANCHOE LACINIATA.

Vern.—*Beng.* and *Hind.*—Hemságar; *Sans.*—Hémaságara; *Bom.*—Zakhm hyát.

A succulent plant of the *Crassulaceæ* order, cultivated in gardens, wild on the hills of North-Western India.

Medicinal uses.—Similar properties have been attributed to the LEAVES to those that will be found under *Bryophyllum calycinum*, the two plants having been confused in early works on Indian *Materia Medica*.

The bruised leaves and JUICE have some reputation as an application to bruises and contusions to allay inflammation and prevent discolouration and as a styptic on fresh wounds.

LACTUCA SCARIOLA.

VAR.—SATIVA.

THE LETTUCE.

Vern.—*Beng.* and *Hind.*—Káhú, Sálád; *Bom.*—Káhu; *Arab.*—Bazr-ul-khas; *Pers.*—Tukm-i-kahu.

This familiar herb, natural order *Compositæ*, is wild on the Western Himálaya. *L. sativa*, the common or garden variety, is cultivated in many parts of India as a culinary vegetable.

The inspissated JUICE of this plant, *Lactucarium*, also called Thridace or lettuce opium, was formerly held in great repute as a sedative, anodyne and antispasmodic. A corresponding preparation, *Extractum Lactucæ*, is still official in the *British Pharmacopœia*, and directed to be made from the closely allied plant *L. virosa*, but it has practically fallen into disuse, although the drug is still employed in France and Germany. *Lactucarium* contains a crystalline principle, *Lactucerin*, besides *Lactucin* and *Lactucic Acid*.

The wild variety is believed to possess the sedative property in greater degree than the cultivated. *Hyoscyamine* is said to be found both in *L. sativa* and *L. virosa*.

The SEEDS are obtainable in the Indian bazárs; they contain a fixed oil.

LAGENARIA VULGARIS.

THE BOTTLE GOURD.

Vern.—*Beng.*—Lau, Kodú; *Hind.*—Lau, Lauki, Tumri; *Sans.*—(Wild)—Katutumbi; (Cultivated)—Alábu; *Bom.*—Karwabopla; *Tam.*—Soriai-kai; *Tel.*—Sora-káya; *Pers.*—Kaddu.

A climbing *Cucurbitaceous* plant found wild and cultivated nearly all over India. The fruit and leaves are edible. The FRUIT contains a thick white pulp which in the cultivated variety (*kodú*) is sweet and edible, while in the smaller wild variety (*tumri*) it is bitter and drastic purgative, resembling that of colocynth. The fruit or gourd grows to a large size, and the outer ligneous rind dries quite hard, the bottle-shaped varieties being made into musical instruments or used as water-bottles. In some parts of the Deccan where the fruits grow to 5 or 6 feet in length they are used as floats or rafts for crossing rivers.

Medicinal use.—The seeds yield an OIL, which has been used as an application to relieve headache.

LALLEMANTIA ROYLEANA.

Vern.—*Beng.* and *Hind.*—Tokmalanga, Kashmálú, Gharei; *Pers.*—Tukhmi-balangá.

This plant, natural order *Labiatæ*, is cultivated to a considerable extent in the Punjáb and other parts for its mucilaginous SEEDS which are used in decoction as cooling and sedative. A poultice of the seeds is found useful in abscesses and inflammations.

LATHYRUS SATIVUS.

Vern.—*Beng.*—Khesárí, Teora; *Hind.*—Khesári; *Sans.*—Triputi; *Pers.*—Masang.

Natural order *Leguminosæ*. Largely cultivated as a pulse crop, chiefly on alluvial soils, in the North-West and Central Provinces. The SEED is a nutritious food, but its continued use has the remarkable property of inducing paralysis, termed lathyrismus, in the lower limbs in men and animals. This toxic property has been traced to a volatile alkaloid which, it is found, is readily dissipated by heat and if the pulse is properly cooked. Dr. George Watt, C.I.E., has recently shown (Indian Medical Congress, December 1894) that a smaller seeded variety known as *lakhori*, believed to be devoid of the poisonous property referred to, is cultivated extensively in the Nagpur and Bhandara districts of the Central Provinces. He can distinguish no botanical difference other than the size of the seed, and is at a loss to explain the apparent diversity in the chemical constitution of the two pulses.

LAWSONIA ALBA.

HENNA : CAMPHIRE: SAMPHIRE.

Vern.—*Beng.*—Méhédi, Shudi ; *Hind.*—Mendhí, Héna ; *Sans.*—Mendhi ; *Bom.*—Mehndi ; *Tam.*—Maroutónri ; *Arab.*—Hiná.

A small fragrant shrub, belonging to the natural order *Lythraceæ*, common nearly all over India and cultivated chiefly as a hedge plant. The leaves yield a dye which is used for staining the hands and finger nails a dull orange colour : in conjunction with catechu and indigo they are also used as a hair-dye. The flowers yield a fragrant Otto or OIL which is much esteemed as a perfume. The seeds contain an oil. The colouring principle of the leaves is believed to be a peculiar tannic acid to which is attributed also their astringent medicinal property. Henna has been known in the East from the most ancient times ; it was the "Cypress of Egypt" and is regarded by the best authorities as referred to in the passage in Solomon's Song (I, 14).—"My beloved is to me as a cluster of Camphire in the vineyards of En-gedi."

Medicinal use.—The LEAVES of henna are astringent, and they are occasionally used as such in infusion for external application.

LENS ESCULENTA.

Syn.—ERVUM LENS.

THE LENTIL.

Vern.—*Beng.*—Musúri ; *Hind.*—Masúr ; *Sans.*—Masura ; *Tam.*—Misur-purpur ; *Tel.*—Misur-pappu ; *Arab.*—Adas.

The lentil, natural order *Leguminosæ*, is grown as a food pulse in various parts of India chiefly in Behar, the Central Provinces and Madras. It has been known in the East

from the remotest times. The flour forms the basis of the Ervalenta (or Revalenta) invalid foods of commerce.

Medicinal use.—As a dietetic agent in the prevention of constipation.

LEPIDIUM SATIVUM.

THE COMMON CRESS.

Vern.—*Hind.*—Hálim, Chansar, Hurf; *Sans.*—Chandra-sura; *Bom.*—Asáliya; *Tam.*—Ali-virai; *Tel.*—Adityalu.

This familiar herb of the *Cruciferæ* is cultivated as a culinary vegetable all over Asia. The SEEDS are available in the bazárs of Western India, and are used to some extent in Native medicine. The HERB and SEEDS contain a volatile aromatic OIL. The seeds contain also a fatty oil.

Medicinal use.—A decoction of the SEEDS (1 in 20) has been found useful in cases of diarrhœa, the chief virtue being in its mucilaginous property.

LIGUSTICUM (sp.)

MATHOSAN.

The roots of an undetermined *Umbelliferous* plant, sold all over Kangra and Kulu. Dr. George Watt, C.I.E., has recently stated (Indian Medical Congress, December 1894), that the *mathosan* roots are made in the districts indicated into cakes with barley and sold as *dheli*, probably identica with the *paps* of the Thibetans. These cakes are used for the purpose of causing the fermentation of *sur* or beer. Dr. Watt regarded these cakes as of considerable service in bread-making and of possible value in the brewing industry.

LINUM USITATISSIMUM.

COMMON FLAX : LINSEED.

Vern.—*Beng.*—Tísí, Mosiná ; *Hind.*—Alsi, Tísí; *Sans.*—Atásí ; *Bom.*—Alási ; *Tam.*—Alashi-virai; *Tel.*—Atasi; *Pers.*—Zaghú.

The flax plant, natural order *Lineæ*, is extensively cultivated, chiefly in Behar, Bengal, and the North-West Provinces, for its SEED—linseed—which forms a most important article of export from Calcutta and Bombay. Three varieties are known in India, distinguished by their colour—brown, white and red. By expression the linseed yields 25 to 30 per cent. of a fixed OIL, linseed oil, which is clear and almost colourless when fresh and prepared without heat, but which is found in commerce of a dark yellowish-brown colour, due to the presence of other seed oils, chiefly those of plants of the natural order *Cruciferæ*, which are usually associated with the flax plant in cultivation. When oxidised by exposure to the air, or in large quantities by boiling with oxide of lead, when the oil assumes the form of "boiled linseed oil," it dries rapidly as a thin transparent varnish consisting of *Linoxyn*. The seeds also contain a considerable quantity of mucilaginous matter which is extracted by cold water as a viscid jelly-like mass. This mucilage is now believed to be produced by the transformation of starch, since unripe linseed contains starch and the ripe seed contains none. The crushed seed or the powdered seed cake after expression of the oil, constitute the various grades of "linseed meal."

A new glucoside *Linamarin* has been isolated from the germs of linseed.

The bast fibres of the stem, prepared and bleached, are manufactured into linen cloth. The best qualities of lint are still made from the retted and finely carded fibre. The

production of the fibre is neglected in India, although it is naturally available in great abundance. The stems are burned as fuel.

Medicinal uses.—The infusion of the SEEDS, "linseed tea," is given internally as a demulcent drink in coughs and in diseases of the urinary organs. The poultice made from linseed meal is a valuable application to inflamed surfaces. A popular remedy to alleviate the pain of burns is "carron oil," a mixture of equal parts of raw linseed oil and lime water.

LIQUIDAMBAR ORIENTALIS.

LIQUID STORAX : ROSE MALLOES.

Vern.—*Beng.*, *Hind.*, *Bom.*, *&c.*—Siláras ; *Sans.*—Silhaka ; *Tam.*—Neri-arishippál ; *Tel.*—Shila-rasam ; *Mal.*—Rasamalla ; *Pers.*—Meih-síla.

The forest tree, natural order *Hamamelideæ*, yielding liquid storax, is a native of the South-Western districts of Asia Minor. The drug is well known in the bazárs of Calcutta and Bombay under the above names, and forms an article of import and export of some importance at the latter city. It is an aromatic, semi-fluid, opaque, grey BALSAM, obtained by boiling the inner bark in water. It is used by the Hindús for perfuming medicinal oils.

Medicinal uses.—Stimulant expectorant. It is seldom used in medicine except as an ingredient of the compound tincture of benzoin.

LITSÆA SEBIFERA.

Syn.—TETRANTHERA ROXBURGHII : T. LAURIFOLIA.

Vern. — *Beng.*—Kúkúr-chhta ; *Hind.*—Garbijaur ; *Bom.*—Maida-lakri (the bark) ; *Tam.*—Maida-lalki (the bark.)

The BARK of this tree, natural order *Laurineæ*, is a popular Native medicine well-known in the bazírs of Bengal as

maida-lakri. It is feebly balsamic, mucilaginous, and esteemed as a demulcent in diarrhœa: externally as an emollient application to bruises. Hooper found the bark to yield on analysis distinct reactions for an alkaloid having the characters of *Laurotetanine*, a poisonous base peculiar to several Javanese lauraceous plants.

LODOICEA SECHELLARUM.

THE SEA COCOANUT.

Vern.—*Hind.*—Daryá-ká-náriyal; *Bom.*—Jáhari-naral; *Tam.*—Kadat-rengáy.

A palm growing in the Seychelles and noticed in this place because the FRUIT is obtainable on the Bombay side. The fruit or nuts attain to a great size, and frequently 40 to 50lbs. in weight, taking, it is said, four years to form and at least ten years to ripen. They were formerly cast ashore in India from the Indian Ocean, and much esteemed in Native medicine. They are now imported and used to some extent by the Natives of North-Western India as food and medicine, being regarded as preservative and alexipharmic.

LUFFA ACUTANGULA.

VAR.—AMARA.

Vern.—*Beng.*—Ghoshá-latá; *Hind.*—Karvi-taru, Turai; *Sans.*—Koshátaki; *Bom.*—Kadú-sirola, Ran-turai; *Tam.*—Pé-pir-kham; *Tel.*—Verri-bíra.

A *Cucurbitaceous* plant cultivated in India, chiefly on the Western side. Dr. Warden has found, in the fruit, a principle soluble in alcohol, having very marked gelatinizing properties. It is named *Luffein.*

Medicinal uses.—The ripe SEEDS of this gourd have been found to possess emetic properties which are believed to

resi le in the kernel, twenty or thirty grains of the dried kernel being administered. The fruit of *Luffa echinata* (Hind.—*Bindál*) has the reputation in Sind of a remedy for jaundice.

MÆRUA ARENARIA.

THE EARTH SUGAR ROOT.

Vern.—*Tam.*—Pumichakarei ; *Tel.*—Puta-tiga.

The earth-sugar root of the Tamils has been known in Southern India for centuries. The shrub belongs to the natural order *Capparideæ*. The ROOT slightly resembles liquorice root in appearance and taste. It is said to be used as an alterative, tonic and stimulant. From an analysis of the drug, made lately by Hooper, it was found to contain ordinary plant constituents and a quantity of sugar, and probably possesses very little, if any, real medicinal value.

MALLOTUS PHILIPPINENSIS.

Syn.—ROTTLERA TINCTORIA : CROTON PHILIPPINENSIS.

MONKEY-FACE TREE : KAMELA OR KAMALA DYE.

Vern.—*Beng.*—Kamilá, Kamila-guri, Kamalá-gundi ; *Hind.*—Kamela, Kamala ; *Sans.*—Rechanaka ; *Bom.*—Shendri, Kamala ; *Guz.*—Kapilo ; *Tam.*—Kapila ; *Tel.*—Kúnkúma ; *Arab*—Kinbíl ; *Pers.*—Kanbélá.

A small evergreen forest tree, belonging to the natural order *Euphorbiaceæ*, found all over India, from Kashmír to Ceylon, and in Burma, Singapore, and the Andamans. It is important as being the source of the valuable dye-stuff *kaméla*, which is a granular, mobile powder of a brick red colour consisting of the minute GLANDS and stellate hairs collected from the surface of the ripe fruits or capsules,

chiefly in the North-West Provinces, the Concans and Madras (Ganjam district).

It is also found in small quantities on the leaves and stalks of the plant, but what is collected for sale is the powder carefully brushed off the capsules.

The kaméla powder is used as an orange brown dye especially for silk. The vernacular names are those of jaundice, referring probably to the yellow colour of the skin in that disease. Kaméla is quite insoluble in water, but soluble in alcohol and ether; the solution in the latter medium extracting about 70 to 80 per cent. of a red resin from which yellow crystalline substances, *Rottlerin* and *Isorottlerin*, may be isolated. The ROOTS are said to yield a red dye.

Medicinal uses.—Kaméla is used as an anthelmintic for the expulsion of tapeworm. It also purges freely in doses of ½ to 2 drachms. Externally it has been used in cutaneous diseases.

Substitutes and Adulterations.—A powder prepared from the fruits of the banyan tree (*Ficus bengalensis*) has been found mixed with *kaméla*. Powdered safflowers have been known to be used as an adulterant. As obtained in the bazárs it is frequently adulterated with sand and earthy matters. The pure article should not yield more than 6 per cent. of ash.

MALVA SYLVESTRIS.

THE COMMON MALLOW.

Vern.—*Hind.*—Viláyati-kangai; *Bom.*—Khubazí; *Pers.*—Nán-i-kulágh (crow's bread); *Arab.*—Khubazi.

A herbaceous plant growing on the temperate Western Himálaya. In common with other *Malvaceous* species

it abounds, and especially the FRUIT, in mucilaginous principles.

Medicinal uses.—The SEEDS are employed internally in decoction as a demulcent. The LEAVES are made into a poultice as an emollient external application.

MANGIFERA INDICA.

THE MANGO TREE.

Vern.—*Beng.*—Am ; *Hind.*—Am, Amb ; *Sans.*—Amra, Chúta ; *Bom.* — Amba, Ambo ; *Bom.* — Thayet ; *Tam.* — Mangas, Mangamaram ; *Tel.*—Elamávi ; *Pers.*—Amba, Naghzak.

An elegant moderate-sized tree of the *Anacardiaceæ* indigenous to India and cultivated in many varieties almost everywhere in the plains, yielding large crops annually of the familiar egg-shaped FRUIT. Mangos are exceedingly plentiful in all the bazárs from May to July, and are esteemed by both Europeans and Natives as the most delicious of Indian fruits. The ripe fruit is very wholesome, nourishing, and highly antiscorbutic ; the unripe fruit is made into refreshing *sherbets* and custards, into pickles and preserves, as a sour ingredient in certain curries, and as the principal ingredient of the *chutnies* so popular in Indian cookery and exported to Europe. The kernel inside the large flattened 'stone' or seed contains about 10 per cent. of tannic acid, of which an enormous quantity must be wasted each mango season, the seeds not being utilized.

The pulp of the ripe fruit contains a trace of gallic acid, with citric acid and gum : the unripe fruit contains about 20 per cent. of free acids, tartaric, citric and malic. The BARK of the tree contains tannic acid and from it exudes a pink-coloured GUM partly soluble in water. The fruit exudes just before ripening a resinous substance

with an odour of turpentine. The BLOSSOM is regarded as astringent.

Medicinal uses.—The powdered KERNEL of the seed, called *amar kusi*, is used as an astringent in diarrhœa, and as a remedy in leucorrhœa, also as an anthelmintic. A fluid extract of the BARK has been recommended in hæmorrhages. The popular idea among Europeans in India that the mango fruit is productive of boils and skin eruptions is a fallacy, and has probably arisen through the coincidence of the occurrence of those symptoms with the mango season the end of the hot season and beginning of the rains. On the contrary, as has been indicated, it is a valuable anti-scorbutic, unless when used immoderately.

MANIHOT UTILISSIMA.

TAPIOCA, MANIOC, SWEET CASSAVA.

Vern.—*Tam.*—Maravuli; *Mal.*—Marachíni.

This plant, natural order *Euphorbiaceæ*, a native of Brazil, is cultivated in Assam and in Southern India. The food-stuff "tapioca" is prepared from the farinaceous root-stalks or tubers.

A variety of the plant known as the bitter cassava is extremely poisonous, the roots containing a proportion of hydrocyanic (prussic) acid.

MARANTA ARUNDINACEA.

WEST INDIAN ARROWROOT.

Vern.—*Beng.*—Ararut; *Hind.*—Tikhor; *Bom.*—Ararut; *Tam.*—Kuamau; *Burm.*—Pen-bwa.

The true arrowroot plant, natural order *Scitamineæ*, a native of the West Indies, is cultivated in Eastern Bengal, the North-West Provinces and in Madras. The author

has cultivated it in his garden at Burdwan and obtained from it a very superior arrowroot. This product is the dried fecula obtained by washing the rasped tubers of this plant and that of *M. ramosissima*. It is a pure starch, and is chiefly given as a light food in invalid diet. It is manufactured and largely used in India, and not exported to any extent. The arrowroot obtained in the bazárs is frequently adulterated with potato starch. This may be detected by the microscope, the granules of potato starch being larger but not materially different in structure.

MARRUBIUM VULGARE.

HOREHOUND.

This herb, natural order *Labiatæ*, is to be found on the Western Himálaya. As grown in Europe it has long had the reputation, in domestic medicine, of an aromatic bitter, expectorant and diuretic.

MATRICARIA CHAMOMILLA.

See ANTHEMIS NOBILIS.

MEL.

HONEY.

Vern.—*Beng.*—Madhu; *Hind.*—Madh shahad; *Sans.*—Madhu; *Bom.*—Madh; *Tam.*—Tén; *Tel.*—Tene; *Arab.*—Aasl; *Pers.*—Angabin.

Honey is a saccharine secretion deposited in the honeycomb of the Honey Bee (*Apis mellifica*) and other species belonging to the insect order *Hymenoptera*. It is a vegetable product, occurring chiefly in the nectaries of many species of flowers, which the bee collects, certain chemical changes taking place in the secretion before it is deposited

by the bee in the honeycomb prepared from waxy substances elaborated within the body of the insect and collected from the surfaces of leaves. The principal change which takes place is that the cane sugar becomes partly converted into *grape sugar* and "invert" sugar or *lævulose* of which honey is mainly composed, together with a little *mannite.*

In many parts of India wild bees attach their nests or combs to branches of trees and in hollow trunks of trees in the jungles and in crevices of rocks. The honey is collected by the people, and in some parts the right to collect the honey and wax (*see* Cera) in the forests is leased out, or the collecting is done by the Forest Department. Bees have been domesticated successfully at Simla and several other places in the hills, an industry which might be extended with much advantage. As collected and prepared in India honey is of somewhat inferior quality, and occasionally deleterious from its having been collected from poisonous flowers.

Medicinal uses —Nutritious and demulcent. Honey has long been a favourite vehicle for medicines with the Hindús. It is used in modern medicine as a flavouring and sweetening agent in mixtures and as a basis for confections.

MELALEUCA LEUCADENDRON.

VAR.—MINOR.

THE CAJUPUT TREE.

Vern.—*Beng.*—Cajupútí, Ilachi; *Hind.*—Kayaputi; *Bom.*—Káyákuti; *Tam.*—Kijapúté.

A large evergreen tree, belonging to the natural order *Myrtaceæ,* indigenous to the islands of the Indian Archipelago. The OIL distilled from the LEAVES is an important

article of commerce at Singapore, being imported from Java, Manilla, Celebes, and other islands where the oil is prepared, and re-exported in large quantities chiefly to Calcutta and Bombay, where it is found in the familiar wine and brandy bottles, in which it is met with in the European drug markets. *Kayaputi-ka-tel,* as it is called in the Calcutta bazár, is a transparent, limpid, volatile OIL, of a pale bluish-green colour, pungent odour resembling a combination of camphor and cardamoms, and bitter aromatic taste. It consists largely of a body which has been named *Cajuputol.* The characteristic green colour has been attributed to chlorophyll, but is generally believed to be due to copper probably from the vessels in which the oil is distilled. It is colourless when rectified.

Medicinal uses.—The OIL may be used internally, although it is very seldom employed, as a stimulant, carminative, and antispasmodic in flatulence and colic, in doses of 2 to 3 minims or ½ to 2 fl. drachms of the official spirit. It is a powerful sudorific. Externally it is largely used in India as a rubefacient in rheumatism either alone and as an ingredient of croton liniment, or combined with other stimulating applications. It is a domestic remedy for all muscular pains.

MELANORRHŒA USITATA.

THE BLACK VARNISH TREE.

Vern.—*Burm.*—Thitsi; *Karen.*—Kiahong.

A forest tree belonging to the *Anacardiaceæ,* and allied to the *Dipterocarpus* species, found at Prome and neighbouring districts in Burma. It is interesting as the source of an OLEO-RESIN known as the black varnish (*thitsi*) of the Burmese, and extensively used as a natural varnish or lacquer and to some extent as a medicine.

Medicinal use.—The OLEO-RESIN is used in Burma in combination with honey as an anthelmintic.

MELIA AZADIRACHTA.

Syn.—AZADIRACHTA INDICA.

THE NEEM OR MARGOSA TREE: INDIAN LILAC.

Vern.—*Beng.*—Nim, Nimgach; *Hind.*—Nim, Nimb; *Sans.*—Nimba, Arishta; *Bom.*—Nim, Bal-nimb; *Tam.*—Vémbu; *Tel.*—Vepa-chétta.

A large ornamental tree, natural order *Meliaceæ*, indigenous to India and cultivated nearly all over the Peninsula and in Burma. It thrives best in the drier climate of the North-West Provinces, and is believed in many places to be advantageous to health when planted around villages, as a prophylactic against malaria. Almost every part of the tree is utilized medicinally, and the powdered BARK and fresh LEAVES were made official in the *Pharmacopœia of India*. The bark contains a bitter principle, of a resinous nature, believed to reside in the inner bark or liber, so that the alcoholic tincture or fluid extract is the most efficient preparation of the bark. Another important product of the tree is the yellow fixed OIL contained to the extent of about 10 per cent. in the SEEDS and extracted by pressure, It has a specific gravity of ·925 at 15°C., a bitter disagreeable taste and alliaceous odour due to sulphur which it contains. According to an exhaustive research by Dr. Warden the *nim* oil consists of the fixed fatty acids—stearic, oleic, and a small amount of lauric,—with butyric and a trace of valeric acids as the volatile fatty principles. Sulphur was estimated to the extent of ·427 per cent. As the result of some unpublished experiments by Mr. J. G. Prebble, it has been found that when the inner bark is moistened with

water a ferment is decomposed which produces a sulphur compound of allyl, allied to that yielded by garlic. The presence of the sulphur and consequent antiseptic property may be accounted for in this way. It is believed that the seeds contains a similar ferment. An undetermined alkaloid was also isolated by Dr. Warden, besides neutral and acid resins. The wood is so bitter that no insect will attack it, and the leaves are used to prevent the ravages of white-ants and other insects.

Medicinal uses.—Ním BARK is a bitter tonic, astringent and febrifuge (in doses of one drachm of the powder or fluid extract.) The OIL is useful as an application in erysipelas, scrofula, and similar skin diseases, and in rheumatism, the organically combined sulphur it contains being believed to be the remedial principle. It has been recommended in combination with chaulmúgra and gurjun oils as an application in leprosy. It is also used as an anthelmintic and insecticide. The LEAVES are applied as a stimulating poultice to boils, hastening suppuration: in decoction they form a valuable antiseptic and healing lotion or fomentation to unhealthy sores. The FRUIT is purgative, emollient and anthelmintic. A GUM exudes from the bark which is regarded as a stimulant.

MELIA AZEDARACH.

THE PERSIAN LILAC.

Vern.—*Beng.*—Ghorá-ním, Maha-nimb; *Hind.*—Drek, Bakayan; *Sans.*—Mahanimba; *Bom.*—Vilayati ním; *Tam.*—Malai-vembri; *Tel.*—Konda-vepa; *Arab.*—Hab-ul-ban; *Pers.*—Ták.

This large tree, another member of the *Meliaceæ*, the mahogany family, is found wild in Persia and the Western Himálaya, and cultivated in some parts of India as an

ornamental tree. It yields products somewhat resembling those of the Indian *ním* in appearance and properties. These include a GUM from the bark and an OIL from the seeds. The BARK has been found to contain resinous principles of an alkaloidal nature which reside in the inner bark.

Medicinal use.—The BARK is recommended as an anthelmintic, a fluid extract being a suitable preparation. The other products are little known.

MELILOTUS OFFICINALIS.

Vern.—*Beng.*—Ban-piring; *Hind.*—Aspurk; *Pers.*—Zirír.

Several species of the *Melilotus* genus, natural order *Leguminosæ*, contain *Coumarin*, a neutral, crystalline, odorous principle obtained chiefly from Tonquin beans and now manufactured artificially. *M. officinalis, alba* and *parviflora* grow in India. Coumarin is also contained in the crescent-shaped legumes of *Trigonella uncata* (*Ilkil-el-malik*), imported from Persia into Bombay.

Medicinal use.—Coumarin is used to disguise the odour of iodoform.

MENTHA ARVENSIS.

THE MARSH MINT.

Vern.—*Beng.*—Pudiná; *Hind.*—Púdínah; *Bom.*—Pudinah; *Tam.* and *Tel.*—Pudiná; *Arab.*—Naanái-hindi; *Pers.*—Púdinah.

This fragrant HERB and *M. sylvestris* are natives of the temperate Western Himálaya. Natural order *Labiatæ*. The true peppermint, *M. piperita*, is not found wild in India, but is frequently cultivated in gardens in the plains. *M. arvensis* yields by distillation an aromatic essential OIL similar to that obtained from peppermint, but inferior in quality and aroma.

The peppermint oils (*pódína-ka-tel* or *atar*) of the Indian bazárs are chiefly imported from Yokohama and Canton, and are sold in the original characteristic packages. The *Japanese Pharmacopœia* recognises *M. arvensis* var. *piperascens*. These oils are inferior to the imported English and American oils.

Peppermint oils contain two characteristic constituents, *Menthol* and *Menthone*. The former is a white crystalline stearoptene ("peppermint camphor") with a strong odour and taste of peppermint, menthone being the liquid portion. Menthol, *pódíne-ke-phul* of the Indian bazárs, is yielded chiefly by the Japanese oil, from which it is deposited on cooling below 4°C. As imported from Japan and China most of the oil is dementholised.

The article known in commerce as "mixed oil" and as "Chinese oil of peppermint" (*Po-ho-yo*) may be obtained. It contains about 40 per cent. of pure menthol.

Medicinal uses.—The HERBS of mint are much esteemed in India as aromatic, carminative, stimulant, antispasmodic, and stomachic. They are used in chutneys. The OIL and menthol have the same properties. The latter is an invaluable anti-neuralgic applied externally in alcoholic solution or in the form of the popular "menthol cone."

MESUA FERREA.

Vern.—*Beng.*—Nágesar; *Hind.*—Nágkesar; *Sans.*—Nágakesara; *Bom.*—Nágchampa; *Tam.*—Nangal; *Tel.*—Nága késara *Mal.*—Veila.

A tree, belonging to the natural order *Guttiferæ*, common on the mountains of Eastern Bengal, the Eastern Himálaya, Burma, and the Andamans; cultivated in gardens in Bengal.

The bark, root, and other parts of the plant exude an aromatic OLEO-RESIN, the purest being found round the base of the tender fruit. The oleo-resin has demulcent properties. The pericarp of the FRUIT is very astringent. A fixed OIL is expressed from the seeds which has been used as an application for cutaneous affections. The dried fragrant FLOWERS are used by Hindú physicians for perfuming medicinal oils. An *atar* is distilled from the flowers.

MICHELIA CHAMPACA.

Vern.—*Beng.*, *Hind.* and *Bom.*—Champá, Champak; *Sans.*—Champaka; *Tam.*—Shampang; *Tel.*—Shampagni-puvvu; *Burm.*—Saga.

A tall evergreen tree, belonging to the natural order *Magnoliaceæ*, growing wild in Nepal, Bengal, Assam and Burma, and commonly cultivated for its yellow, sweetly-scented flowers which are given as an offering to the gods and of which an otto, somewhat resembling that of the *ilang*, is prepared. A kind of camphor, named *Champacol* has been obtained by distillation from the WOOD.

Medicinal uses.—An infusion of the FLOWERS has been advocated as a stimulant tonic and carminative. The BARK is bitter and aromatic, and has been regarded as antiperiodic in doses of 10 to 30 grains. The medicinal principle has not been investigated, but the author has found that it is volatile and is dissipated by boiling in water.

MIMOSA PUDICA.

THE SENSITIVE PLANT.

Vern.—*Beng.*—Lájjábati; *Hind.*—Lajálú; *Sans.*—Anjalikarika,

This familiar plant, natural order *Leguminosæ*, is a native of Brazil, but has long been naturalized and is plentiful in

the hotter regions. Medicinal properties, largely fallacious, have been attributed to it. The ROOT contains a peculiar tannin.

MIMUSOPS ELENGI.

Vern.—*Beng.*—Bakul ; *Hind.*—Mulsári ; *Sans.*—Bakula ; *Tam.*—Mogadam ; *Tel.*—Pogada ; *Burm.*—Khaya.

A large ornamental evergreen tree, of the natural order *Sapotaceæ*, cultivated in India and found wild in the forests of Southern India and Burma. A perfume is distilled from the fragrant star-shaped FLOWERS. The BARK has been regarded as astringent, tonic, and febrifuge, but it is of little value or interest. A decoction is used as a gargle and mouthwash. The pulp of the FRUIT is edible and contains a large amount of sugar. The fatty oil obtained from the SEEDS is much valued in Tanjore.

MOMORDICA CHARANTIA.

Vern.—*Beng.*—Karalá ; *Hind.*—Kareli, Karela ; *Sans.*—Káravella ; *Bom.*—Kárlá ; *Tam.*—Pavakka-chedi ; *Tel.*—Kakarachettu ; *Arab.*—Quisaul-barri.

This climbing plant, natural order *Cucurbitaceæ*, is cultivated in gardens everywhere in India for its FRUIT, which is wholesome and eaten as a vegetable. There are two varieties, one with a small roundish or ovoid fruit (*Uchchhe* of the Bengal bazárs) and the other longer and more cucumber like.

Medicinal uses.—The FRUIT is bitter, acts as an anthelmintic, stomachic, antibilious and laxative. The juice of the fresh LEAVES is given to children as a mild purgative, but is not unattended with danger.

MORINDA CITRIFOLIA.

THE INDIAN MULBERRY.

Vern.—*Beng.*—Ach ; *Hind.*—Al ; *Bom.*—Aal ; *Tam.*—Mina maram ; *Tel.*—Maddi-chettu.

This small tree or bush is found wild and cultivated nearly all over India. It belongs to the natural order *Rubiaceæ*. The LEAVES and FRUIT are supposed to be medicinal, and the ROOT and root-bark yield a red dye somewhat resembling that imparted by madder. This is used for colouring the red *kharua* cloth which is universally used for covering account books by the people of India, as it is not attacked by white-ants. A crystalline principle has been isolated from the root-bark and named *Morindin*.

Medicinal uses.—The LEAVES and FRUIT have been regarded as deobstruent and emmenagogue.

MORINGA PTERYGOSPERMA.

THE HORSE-RADISH TREE.

Vern.—*Beng.*—Sojná ; *Hind.*—Shajna ; *Sans.*—Sóbhánjana ; *Bom.*—Saragavo ; *Tam.*—Morungai ; *Tel.*—Munaga.

A beautiful tree, of the natural order *Moringeæ*, wild in the Sub-Himálayan range, and commonly cultivated in India and Burma for its leaves, flowers and immature capsules, which are eaten in curries. The ROOT resembles in appearance and odour that of the horse-radish *Cochlearia Armoracia*, and is regarded as an efficient substitute for it. Distilled with water it yields an essential OIL more pungent and offensive in odour than those of mustard or garlic. The SEEDS yield a fine fixed OIL (*Ben* Oil) which does not turn rancid, and hence is much valued by perfumers for extracting the odours of flowers and by watchmakers as a lubricant.

The bark exudes on incision a GUM of the tragacanth order, being partially soluble in water and in spirit. The bark has been found by Dymock to contain an alkaloid and two resins.

Medicinal uses.—The fresh ROOT is regarded as an acrid, pungent, stimulant. It has been used as a vesicant and considered a good remedy in bites of rabid animals, epilepsy and hysteria. It is also reckoned a useful rubefacient in palsy and chronic rheumatism. The OIL is considered aperient and used in gout and rheumatism.

MORUS ALBA.

VAR.—INDICA.

THE WHITE MULBERRY.

Vern.—*Beng.* and *Hind.*—Tút, Shah-tut; *Bom.*—Tutri; *Tam.*—Kambilipúch; *Pers.*—Tút.

The Indian white mulberry is found wild on the temperate Himálaya and cultivated in Kashmír, the Punjáb, Bengal and Burma, chiefly for its leaves, on which the silkworm feeds. The sub-acid FRUITS are eaten fresh and dried. Syrup of mulberries is useful in sore-throat. It is seldom used in India.

MOSCHUS MOSCHIFERUS.

THE MUSK DEER.

Vern.—(Musk) *Beng.*—Kastúrí; Mriga-nábhi; *Hind.*—Kasturi, Mushk; *Sans.*—Kasturi; *Pers.*—Mushk.

The musk deer lives at altitudes above 8,000 feet throughout the whole range of the Himálaya and in Thibet

and Assam. It belongs to the order *Ruminantia*: family *Moschidæ*. The well-known, dark-coloured, granular substance, MUSK, is a dried secretion obtained from the preputial follicles, contained in a globular sac, about 1½ inch in diameter, known as the 'musk-pod.' This is cut from the body of the slain deer while it is still hot and carefully dried in the sun or more rapidly on a hot stone, the latter method producing an inferior product. Only the male deer produces the odoriferous secretion, and each animal yields one pod weighing on an average one ounce, the hunters obtaining in the markets of Northern India, usually by barter, 15 to 20 or 25 rupees.

The pods, enclosed in a portion of the hairy skin, and often adulterated with the dried blood of the animal or fragments of the liver and in various other ways, are very frequently offered to chemists and merchants in Simla, Darjíling and Mussúrie, and occasionally in Calcutta. A large part of the musk supply of the world is distributed from Bengal, although the exports would seem to be declining owing to shortness of supply, due doubtless to the wholesale extermination of the deer, estimated by Dr. Watt at 20,000 annually, including females, the hunters not being always able to identify the males. The characteristic constituent of musk is a volatile oil which it contains, in addition to ammonia, stearin and cholesterin.

Medicinal uses.—The drug has long been valued in Hindú medicine and regarded as a stimulant and aphrodisiac in debility and impotence. It is given in modern medicine in hysteria and epilepsy. It is very frequently prescribed in India as a stimulant, combined with other restoratives and as an antispasmodic, in tincture or powders. It is often given with camphor, which has the property of destroying the odour to a large extent.

Substitutes.—The odour of musk is found in several other members of the animal and vegetable kingdom. The "musk-rat" of India secretes a substance possessing the odour of the true musk, which is not, however, utilized. The common musk plant, *Mimulus moschatus*, is well-known and the seeds of *Hibiscus Abelmoschus* (q. v.) are used in perfumery. The manufacture of artificial musk has lately been perfected, and this article is likely to become a formidable rival to the natural product.

MUCUNA PRURIENS.

Syn.—DOLICHOS PRURIENS.

THE COWHAGE PLANT.

Vern.—*Beng.*—Alkushi; *Hind.*—Kiwánch, Kiwachh; *Sans.*—Kapikachchhu; *Bom.*—Kuhilí; *Tam.*—Punaik-káli; *Tel.*—Pilli-adugu.

An annual climbing shrub of the *Leguminosæ*, wild in Bengal and common in the forests throughout the plains. It is cultivated in some parts for the sake of the golden brown velvety LEGUMES which are cooked and eaten as a vegetable. The name "cowhage" is derived from the Hindi *kiwachh*.

The pods are covered with stiff hairs which produce an intense irritation of the skin if incautiously handled.

Medicinal uses.—The HAIRS covering the seed pods mixed with honey have been used as a vermifuge, the action being purely mechanical. They are seldom employed in modern medicine, although the pods are still exported from India. The SEEDS have been regarded as a nervine tonic and the ROOT as useful in paralysis and affections of the nervous system.

MUSA SAPIENTUM.

Syn.—M. PARADISIACA.

THE PLANTAIN OR BANANA.

Vern.—*Beng.*—Kala ; *Hind.*—Kéla ; *Sans.*—Kadali; *Bom.*—Kéla ; *Tam.*—Valei ; *Tel.*—Kadali.

An indigenous, perennial, herbaceous plant belonging to the natural order *Scitamineæ*, usually 10 to 12 feet high, cultivated universally in many varieties throughout India for its nutritious and delicious fruit.

The finer fruit of *M. sapientum* has been regarded by some botanists as the true banana and the coarser fruit of *M. paradisiaca* as the plantain, but the former is regarded by recent writers as embracing both forms (Watt).

The unripe fruit contains as much starchy matters as the potato, and is largely employed in Africa and the West Indies in the fresh and sun-dried state, and powdered, ("plantain meal") as a food-stuff, but various investigators have lately shown that it is not to be regarded as equal to the potato in nutritive value. The fully ripe fruit contains about 20 per cent. of sugar. The plant fruits once only, and is then cut down for fodder or burned for the alkaline ash, rich in potash, which it yields, and which is used instead of country soap or Fuller's earth for washing clothes. The flowers (*mocha*) and the inner portion of the young stems (*thor*) are eaten as vegetables.

Medicinal uses.—The tender FRUIT is nutritive, antiscorbutic and slightly astringent. It forms a valuable diet in dysentery and diarrhœa. The fully ripe fruit is laxative if taken regularly in the early morning. The cooked FLOWERS are used in diabetes. A syrup of bananas is popular in America for producing a refreshing beverage and as an effective remedy in relieving bronchitis. In addition to many

domestic purposes to which the large leaves are put in India, chiefly for serving food on at feasts and largely as a substitute for wrapping paper, the young tender leaves are used as a cool dressing for inflamed and blistered surfaces, as a green shade for the eyes, and in many charitable dispensaries in place of oiled silk and gutta-percha to retain the moisture of water dressings.

MYLABRIS CHICORII.

THE TELINI FLY.

Vern.—*Beng.*—Telini-poka ; *Hind.*—Télní, Telni-makhi.

Several species of insects of the *Coleoptera* or beetle order, with vesicant properties when dried, similar to those of the blistering or Spanish fly (*Cantharis vesicatoria*), are common in India. The most important is the *M. chicorii* which exists plentifully in many parts of India, quite common in the Hyderabad district and Deccan. This insect has been found to yield a fatty acid believed to be *Cantharidin* in greater quantity than the true cantharides, for which it has been substituted, for external application, in medical practice in India.

MYRICA NAGI.

Syn.—M. SAPIDA.

THE BOX-MYRTLE.

Vern.—*Beng.*, *Hind.* and *Bom.*—Kaiphal ; *Sans.*—Katphala ; *Tam.*—Marudam-pattai ; *Tel.*—Kaidaryamu.

An evergreen tree, natural order *Myricaceæ*, of the Subtropical Himálaya, found also in the Khasia mountains and the hills of Burma.

The BARK is exported from the bazárs of Northern India, and usually to be found in the drug markets of the large cities. A recent examination of the bark by Hooper shows it to contain 11 to 14 per cent. of tannin and indications of an alkaloidal principle.

Medicinal uses.—The BARK is aromatic and astringent. The powder is recommended as a snuff in catarrh and in combination with ginger as an external stimulant application in cholera.

MYRISTICA FRAGRANS.

Syn.—M. OFFICINALIS: M. MOSCHATA.

Vern.—(The Nutmeg) *Beng.* and *Hind.*—Jayphal, Jaiphal; *Sans.*—Játi-phalam; *Bom.*—Jaiphal; *Tam.*—Jadikkay; *Tel.*—Jajikaya.

(Mace) *Beng.*—Jáitri; *Hind.*—Japatr; *Sans.*—Játi-patrí; *Bom.*—Jawantrí; *Tam.*—Jadi-pattiri; *Tel.*—Japatri.

The nutmeg tree, natural order *Myristicæ*, is cultivated in the Malay Peninsula and Penang. It has been successfully cultivated in Madras and Southern India. The SEEDS are the nutmegs of commerce and the *arillus* surrounding the seed within the outer shell constitutes, when dried, the product known as mace. The nutmeg yields an essential and a fixed OIL: mace also contains a peculiar essential OIL.

The fixed oil, "nutmeg butter," commonly, but erroneously, called "oil of mace," is obtained by expression, the powdered nuts being steamed and pressed while hot. It occurs in solid blocks or "bricks" of a yellowish-brown colour, somewhat mottled, and imported from the Banda Islands into India as *Jawitri-ka-tel.* It consists essentially of *Myristin* and *Myristic Acid* and retains a certain proportion of the essential oil. The essential oil is obtained by distillation, and is water-white in colour, with

the fragrant spicy odour of the nutmeg. Its constituents have been named *Myristicene* and *Myristicol*. The essential oil of mace is of a yellowish colour, with the odour of mace, and consists of *Macene*. These volatile oils are used to a large extent in perfumery.

Medicinal uses.—The nutmeg is an aromatic stimulant, carminative, and in large doses narcotic. It is chiefly employed as a flavouring agent and condiment. The concrete OIL is used in India as a rubefacient. The essential OIL is administered in diarrhœa and dysentery to relieve pain, and is used in combination with other stimulating oils as an external application in rheumatism.

MYRISTICA MALABARICA.

BOMBAY MACE.

Vern.—*Bom.*—(The Nut) Jangli jaiphal.—(The Mace) Rámpatri.

This tree is indigenous to the Concans, Kanara and Malabar, and yields a SEED, larger and more oblong than the true nutmeg, but containing a fixed OIL analogous to that expressed from the latter.

The *arillus* is known as "Bombay Mace," and has been used to adulterate powdered mace. It is greatly deficient in odour and flavour. Several tests have been proposed for its detection depending chiefly on the deeper brownish yellow colour of the inferior article.

MYRSINE AFRICANA.

Vern.—*Hind.*—Bebrang, Bahbarang, Baibarang.

A small shrub, of the natural order *Myrsineæ*, found in the Himálaya from Kashmír to Nepal. The FRUIT is

common in the Punjáb bazárs, and is said to be a powerful cathartic vermifuge. The PLANT also yields a GUM which is prescribed for dysmenorrhœa.

MYRTUS COMMUNIS.

THE MYRTLE.

Vern.—*Hind.*—Hab-ul-ás ; Viláyati mehndi.

This shrub, natural order *Myrtaceæ*, is cultivated in many parts of India.

Medicinal uses.—The fragrant volatile OIL, distilled from the LEAVES, has antiseptic and rubefacient properties. The fruit, myrtle berries, is carminative and given in diarrhœa and dysentery.

NARDOSTACHYS JATAMANSI.

Syn.—VALERIANA JATAMANSI.

SPIKENARD.

Vern.—*Beng.*—Jatámánsi ; *Hind.*—Jatamansi, Bal-chhar ; *Sans.*—Jatámánsi ; *Bom.*—Sumbul ; *Tam.*—Jatamáshi ; *Tel.*—Jatamámshi ; *Arab.*—Sumbulu'l-hind ; *Pers.*—Sunbuluttib.

An herb, belonging to the natural order *Valerianeæ*, growing at great elevations on the Alpine Himálaya, in Nepal, Bhutan, and Sikkim, ascending in some places to 17,000 feet.

It occurs in the Native drug sellers' shops as the short RHIZOMES with the tufted fibrous remains of radical leaves not unlike a "shock" head of hair, the Sanskrit names indeed having a reference to this resemblance. It is the Spikenard of the ancients "and there is much reason to believe, from a general view of the early history of *Jatamansi*, that the ointment of Spikenard alluded to by

St. John, and the alabaster box of ointment mentioned by St. Mark, contained as the principal ingredient the essence yielded by this plant. Spikenard is also mentioned more than once in the "Song of Solomon." As the ointment was usually described as having been 'poured' when used, its consistency must have been rather in the nature of an oil in which condition *Jatamansi*, mixed with a variety of other perfumes, is in common use as a hair-wash among Indian women at the present day." (J. F. Duthie, in *Watt's Dict. Econ. Prod. Ind.*) The drug is bitter and aromatic with an odour likened by Dymock to a mixture of valerian and patchouli. It yields on distillation an essential OIL which resembles in its properties that of valerian.

Medicinal uses.—The drug is regarded as a tonic, nervous stimulant and antispasmodic. It is little used in India at the present time, but has been advocated as an efficient representative of valerian in hysteria, epilepsy and similar nervous and convulsive affections. The dose is from 30 to 40 grains in powder. A fluid extract prepared with an ammoniacal menstruum would probably be the most suitable preparation. The OIL is administered in epilepsy in doses of 2 to 5 minims. Jatamansi is chiefly used in India as an agent in perfumery and as an ingredient in medicinal oils. It is popularly believed to increase the growth and blackness of the hair.

NAREGAMIA ALATA.

GOANESE IPECACUANHA.

Vern.—*Mar.*—Tinpáni, Pittvel; *Kan.*—Nela-naringu; *Goa.*—Trifolio.

A small woody shrub, of the natural order *Meliaceæ*, growing in Western and Southern India. It is known as "country ipecacuanaha" at Goa and Calicut where it is

collected. The drug consists of the creeping ROOTS and slender STEMS divested of leaves. It has a pungent aromatic odour and little taste. An investigation of this drug by Hooper revealed the presence of an alkaloid for which he proposed the name *Naregamine*, an oxidizable fixed oil and a wax.

Medicinal uses. — Emetic properties have long been attributed to the ROOT in South-Western India. It was reported on from Madras some years ago as a remedy equal to ipecacuanha, in the same doses, in acute dysentery, and as an emetic and expectorant. The drug as above described has lately been tried in Europe with considerable success as an expectorant, in chronic forms of bronchitis, where there is a thick scanty and tenacious expectoration and in bronchial catarrh with asthmatic tendencies and heart difficulty. The preparation recommended is a fluid extract in doses of 2 to 10 minims. Naregamia exerts no special influence on the circulation or on the digestive functions, and no toxic properties reside in the remedy.

NELUMBIUM SPECIOSUM.

THE SACRED LOTUS.

Vern.—*Beng.*—Padma ; *Hind.*—Kanwal ; *Sans.*—Padma ; *Bom.*—Kamala; *Tam.*—Ambal; *Tel.*—Evra-támara-veru; *Arab.* and *Pers.*—Nilufer.

A large aquatic herb, belonging to the natural order *Nymphæaceæ*, with elegant, sweet-scented, white or red flowers. It is held sacred by the Hindús to Lakshmi, the goddess of wealth and prosperity, and occupies an important place in their religion and mythology. An alkaloid has been isolated from the rhizome.

Medicinal uses.—The FLOWERS, filaments and juice of the flower-stalks are regarded as refrigerant and astringent,

and are recommended as a cardiac tonic. The seeds are edible, forming the *makhana*, a diet used in certain ceremonials. The ROOT is mucilaginous and demulcent, given in piles. The SEEDS are used as an application in cutaneous affections. The large leaves are used as cool bed-sheets in high fever with much heat of the skin.

NERIUM ODORUM.

THE SWEET-SCENTED OLEANDER.

Vern.—*Beng.*—Karabi; *Hind.*—Kanér, Kanél; *Sans.*—Karavira; *Bom.*—Kanhera; *Tam.*—Alari; *Tel.*—Ganneru.

A small evergreen shrub, with a yellowish milky juice, wild in Western Afghanistan and in several other parts of Northern India and cultivated in gardens for its flowers which are given as an offering to the gods. There are two varieties, one with red and the other with white flowers: natural order *Apocynaceæ*. The fresh roots of the white variety, known in Bengal as *Sheth-karabí*, are intensely poisonous, as are also the leaves, bark and flowers. The bark has been found by Prof. H. G. Greenish to contain two resinous bitter principles, one soluble in chloroform and little soluble in water to which he has given the name *Neriodorin*, and the other very soluble in water and insoluble in chloroform, which he has named *Neriodorein*. Both these substances are powerful heart poisons, and it has been shown by Prof. T. R. Fraser that the physiological action of oleander is analogous to that of digitalis. It is not, however, used internally in any form. Subsequent investigations have shown the leaves to contain two principles which have been named *Oleandrine* and *Pseudocurarine* (Lenkowsky), and which are probably identical with those isolated by Greenish, while two glucosides have

been isolated from the leaves and named *Neriine* and *Neriantine* (Schmiedeberg, 1883), the former being believed to be identical with digitaleïne. A further research has revealed the presence of another glucoside *Rosaginine,* so named from the German name of Oleander, *Cortex Rosaginis.* The seeds of *N. thebaci,* the yellow oleander, are intensely poisonous. Cases have been known of children mistaking them for almonds with fatal effect.

Medicinal uses.—The ROOT is used externally, made into a paste with water as an external application in chancres and ulcerations, and is said to be also applied in leprosy. A decoction of the LEAVES is useful to reduce swelling. Criminal records show that the root is used to procure abortion.

NICOTIANA TABACUM.

TOBACCO.

Vern.—*Beng.*—Támák ; *Hind.*—Támáku ; *Bom.*—Tambakhu *Tam.* — Poghákо ; *Tel.* — Pogáku ; *Arab.*—Tanbak ; *Pers.*— Tanbaku.

The tobacco plant, natural order *Solanaceæ,* is a native of America. It is quite common in India in a semi-wild state as an escape from cultivation. It is cultivated to a very large extent, over 2,000,000 acres being under tobacco in India in many parts of Bengal, Bombay and Burma, and in Madras and Travancore. *N. rustica* is cultivated and prepared in some parts of Upper India, Bengal and the Punjáb. It is known as East Indian tobacco.

Tobacco is used in India as an article of luxury by all classes of the people, chiefly for smoking and by some races in powder as snuff, and by others with lime and *pán*

for chewing, while Burma, Trichinopoly and other 'cheroots' of Indian manufacture are popular with Europeans, the greater part of the tobacco produced, which is entirely free of duty or restriction, being consumed in the country. As prepared by the Natives for smoking the coarsely powdered tobacco is mixed with unrefined sugar (*gúr*) and aromatic and fragrant substances, sometimes with sandalwood oil, patchouli leaves, otto of roses, musk and other perfumes into the form of a black-looking conserve known as *gúrakú*. A portion of this is placed with live charcoal in the *chilam* of the universal *hookah*, made commonly of a cocoanut shell or of metal and which, as is well-known, contains water through which the vapour is passed in smoking. The practice, in some parts of India, is equally common with women and children as with men.

Tobacco leaves contain *Nicotine*, an intensely poisonous, colourless liquid alkaloid which darkens with age, and *Nicotianine* or "tobacco-camphor," a concrete volatile oil to which the odour of tobacco is due, the oppressive odour which nicotine acquires on keeping being probably due to the presence of this substance. Other toxic bodies produced on combustion of tobacco, as in pipe-smoking, and which are believed to cause the disagreeable symptoms sometimes experienced by persons who indulge in this habit, are *Pyridine*, *Picoline*, *Parvoline* and *Collidine* while hydrocyanic, formic, carbolic and other acids are said to have been found in the residues condensed from the smoke.

Medicinal uses.—Tobacco is little used in modern medicine on account of its poisonous properties, although it had a place in the *British Pharmacopœia* of 1867, when an enema, used for the expulsion of worms, was official. It is still used to some extent in veterinary medicine. The

dried leaves are powerfully sedative, affecting the heart, frequently causing great depression, antispasmodic, emetic and narcotic. A decoction has been used as a fomentation to the spine in tetanus, and as a means of inducing muscular relaxation, thus aiding in the reduction of strangulated hernia and dislocations. Tobacco-smoking is resorted to with excellent effect in many cases of asthma, nervous irritability and sleeplessness, and it is in common repute as a prophylactic against diseases of microbic origin. A common and useful practice in India is to insert the smoothed stem of the leaf, sometimes dipped in castor oil, after the form of a suppository, for children as a laxative. Nicotine has been recommended in tetanus and as an antidote to strychnine. Its internal use is attended, however, with the greatest danger.

NIGELLA SATIVA.

SMALL FENNEL.

Vern.—*Beng.*—Kála-jíra, Mugrela; *Hind.*—Kala-jíra, Kalaungi; *Sans.*—Krishna-jiraka; *Bom.*—Kalonji; *Tam.*—Karum-shiragan; *Tel.*—Nalla-jilakara; *Pers.*—Siyáh-dánah.

This plant, natural order *Ranunculaceæ*, is cultivated in some parts of India for its seeds, which are used as a condiment in curries. It is believed to be the "black cummin" of Scripture. The small triangular seeds, which resemble coarse gunpowder, contain a clear fixed and a yellowish volatile oil of disagreeable odour, and specific gravity 0·875 (Schimmel, 1895), which is not fluorescent as has been stated. Greenish found the seeds to contain *Melanthin*, a substance allied to helleborin and like saponin possessing emulsifying powers.

Medicinal uses.—The SEEDS are aromatic, carminative, and stomachic; they are used as a corrective of purgatives and other medicines, and are believed by the *hakíms* to possess diuretic, anthelmintic, and emmenagogue properties. They have a decided action as a galactagogue. A common domestic use is as a protection for linen against the ravages of insects. The oil removes the odour of iodoform to a great extent.

NYCTANTHES ARBOR-TRISTIS.

NIGHT JASMINE: WEEPING NYCTANTHES.

Vern.—*Beng.*—Seoli, Singhár, Harsínghár; *Hind.*—Har, Harsinghár; *Sans.*—Sephálikâ; *Bom.*—Harasingara; *Tam.*—Manja-pu; *Tel.*—Paghada.

A small tree, also called the square-stalked *Nyctanthes* from the shape of the young shoots, natural order *Oleaceæ*, found wild in the forests of Central India and the Sub-Himálayan regions and commonly cultivated in gardens in many parts of India for its fragrant flowers which are given as votive offerings and of which a perfume is made. The flowers open at sunset, and before morning the ground is strewn with the fallen corollas. These are collected by Native women and children, and the orange-coloured corolla tubes having been separated from the white petals, they are dried in the sun, and yield on boiling a beautiful but fleeting yellow dye for silk.

The leaves have been investigated by the authors of the *Pharmacographia Indica* and shown to contain an alkaloidal principle, named provisionally *Nyctanthine*.

Medicinal uses.—The LEAVES are regarded as antibilious and expectorant; used in bilious fevers. The juice of the fresh leaves is also a safe purgative for infants.

NYMPHÆA LOTUS.

THE WATER-LILY.

Vern.—*Beng.*—Sháluk, Nál; *Hind.*—Nilofar, Chota Kanval; *Sans.*—Kamala; *Tel.*—Tella-kaluva.

The water-lily is regarded as the queen of Indian flowers, beloved of the poets and sacred to the gods, and only second in estimation to the lotus (*Nelumbium speciosum*). There are three varieties, the white, red, and blue, and they grow in tanks and marshes throughout the warmer parts of India. Natural order *Nymphæaceæ*.

Medicinal uses.—These may be considered to be the same as those of the corresponding parts of *Nelumbium speciosum* already described. The roots and seeds are edible, the latter forming the diet known as *Dhapar-koki*.

OCIMUM BASILICUM.

THE SWEET BASIL.

Vern.—*Beng.*—Babuí-tulsi, Debunsha; *Hind.*—Bábúl, Sabza, Kali-tulsi; *Sans.*—Munjariki; *Bom.*—Sabja; *Tam.*—Tiruni-tru-pachchai; *Tel.*—Bhú-tulasi.

A small shrub indigenous to Persia and Sind, cultivated in gardens in India. It belongs to the same natural order as the mints—*Labiatæ*—some of the cultivated forms resembling mint to a small extent in appearance and odour. The whole plant is aromatic, with an odour slightly resembling that of cloves. On distillation with water the leaves yield an essential OIL which when kept solidifies as crystalline camphor allied to menthol and called *Basil-camphor*. The seeds are mucilaginous.

Medicinal uses.—The plant is regarded as carminative and stimulant, the SEEDS demulcent and diuretic.

The plant has lately been stated (*Pharm. Journal*, IV, 1306, p. 51), to be useful in nasal myosis, used by irrigation in the form of a 12 per cent. decoction, producing local anæsthesia, and acting as a parasiticide and antiseptic so that the larvæ which cause the disease are rendered inactive and expelled. It has long been used in Bengal with like effect for a similar affection known as *pínash*.

OCIMUM SANCTUM.

The Sacred Basil.

Vern.—*Beng.*—Tulasi; *Hind.*—Kala-tulsi, Varandá; *Sans.*—Manjarika, Tulasi; *Bom.*—Tulasa; *Tam.* and *Tel.*—Tulasi.

The holy basil is the most sacred plant of the Hindús, being dedicated to Vishnu, the Preserver of the World. It is an herb or small shrub belonging to the natural order *Labiatæ*, found throughout India and universally cultivated for ceremonial purposes. It may be seen everywhere near Hindú houses, and near the doorways of nearly all European houses, where it is tended by Hindú servants. The wood is made into beads.

Medicinal uses.—The dried plant has expectorant and stomachic properties. It is a domestic remedy for croup. The seeds are mucilaginous and demulcent.

OLDENLANDIA CORYMBOSA.

Vern.—*Beng.* — Khetpapra; *Hind.* — Daman-papar; *Sans.*—Parpata.

A Plant belonging to the *Rubiaceæ*, common as a weed throughout India. It is considered useful as an alterative in low forms of fever, administered in decoction. The root of *O. umbellata* is the chay-root or Indian Madder, used as a dyeing material.

ONOSMA BRACTEATUM.

Vern.—*Beng.*—Gao-zabán.

A plant of the *Boragineæ* growing on the Western Himálaya. The leaves are imported from Persia and sold in the bazárs, and the flowers are known as *guli-i-gao-zaban. Gao-zaban* has the reputation among the *hakíms* of being a mild tonic and alterative. It has perhaps little medicinal value.

ONOSMA ECHIOIDES.

Vern.—*Beng.* and *Hind.*—Ratanjot.

This plant is plentiful in the Western Himálaya. The root is used as a red colouring matter to medicinal and toilet oils.

Medicinal uses.—The bruised Root is applied externally to eruptions, and the Flowers as a cardiac and stimulant in rheumatism and palpitation of the heart.

OPHIORRHIZA MUNGOS.

The Mongoose Plant.

Vern.—*Beng.*—Gandhanákuli; *Hind.*—Sarahati; *Sans.*—Sár páksbi; *Tam.*—Kiripurandan; *Tel.*—Sarpáshi-chettu.

An herb belonging to the *Rubiaceæ*, found in the mountains of Assam, Burma, the Western Peninsula and Ceylon. The roots are sold to ignorant people in some places as a charm against snake-bite, the name of the plant having some relation to the fact that the plant is supposed to afford the curious little animal, the mongoose, an antidote to the bites of poisonous snakes. Medicinally the Root is an agreeable bitter tonic.

OPIUM.

See PAPAVER SOMNIFERUM.

OPUNTIA DILLENII.

Syn.—CACTUS INDICUS.

THE PRICKLY PEAR.

Vern.—*Beng.* and *Hind.*—Phani-manasa; Nág-phana; *Tam.* and *Tel.*—Nágadali

A native of America, now naturalised in India, great tracts growing in Rajputana and in Madras and Mysore and other places. Natural order *Cacteæ*. The cochineal insect might be profitably fed on the prickly pear in many parts of India.

Medicinal uses.—The FRUIT is refrigerant and has been recommended, made into a syrup, as an expectorant and remedy in whooping cough and asthma. It contains malic acid and manganese. The LEAVES made into a pulp are used as a poultice.

ORCHIS MASCULA.

THE SALEP ORCHID.

Vern.—*Beng.* and *Hind.*—Salep-misrí, Salab-misrí; *Tam.*—Shálá-mishiri; *Tel.*—Sálá-misiri; *Pers.*—Sálabmisri.

Several species of terrestrial orchids, natural order *Orchideæ*, found in Europe and Northern Asia, yield the salep of commerce. The most important are:—*O. mascula*, *O. latifolia*, *O. laxiflora*, *O. maculata*, and others. The salep of the Indian bazárs is principally imported from Persia and Afghanistan *viâ* Bombay, some of it being probably of European origin. Several species of *Eulophia* (q. v.) found in Northern India, yield tubers which are used locally as substitutes for salep. A bitter variety known in India as Royal Salep (*Badsah-Salab*) is derived

from *Allium Macleani* (*Liliaceæ*). *Salep misri* consists of the washed, scalded and dried TUBERS, hard and horny, translucent in appearance, almost odourless,and with a very slightly sweetish mucilaginous taste. It is met with in several forms—palmate (onc eknown and highly esteemed as *Radix Palmæ Christi*) and in more or less ovoid or rounded tubers, sometimes strung together. It yields a large quantity of mucilage to water, and on boiling, even with 40 parts of water, forms a thick jelly which is regarded as highly nutritious.

Medicinal uses.—Salep has long been esteemed in India as a tonic aphrodisiac. It is now generally regarded as a valuable nutritive diet specially useful in diarrhœa and dysentery and in chronic fever. For this purpose it may be boiled with milk.

ORIGANUM VULGARE.

Vern.—*Hind.*—Sáthra.

A common herb of the temperate Himálaya. Natural order *Labiatæ*. It is used in some parts of the Punjáb as a pot-herb like mint. It yields a volatile OIL which is used as an aromatic stimulant in colic and locally in rheumatism and earache. *O. Marjorana* (Marjoram)—*Marwa*—of the bazárs is also cultivated in gardens for the same purposes.

OROXYLUM INDICUM.

Syn.—BIGNONIA INDICA.

Vern.—*Beng.*—Soná, Násoná; *Hind.*—Arlú, Sauna; *Sans.*—Syonáka; *Bom.*—Tetu, Sauna assar; *Tam.*—Vanga-maram; *Tel.*—Dundillam.

A small tree with terminal spikes of large, fleshy, lurid flowers, natural order *Bignoniaceæ*, growing all over

India and Ceylon. The ROOT-BARK is well known and much esteemed by the Natives, being an ingredient of the *Dasamula* of Hindú medicine, a compound decoction of ten drugs held in great repute and used in remittent fevers and other diseases. An exhaustive examination of the root-bark by Naylor and Chaplin (1890) revealed the presence of a yellow crystalline body which was named *Oroxylin*, in addition to acrid, pectinous, and astringent principles and citric acid.

Medicinal uses.—The ROOT-BARK is regarded as astringent and tonic, useful in diarrhœa and dysentery. It is said to be used by the Gonds, by whom it is known as *Jaimangal*, as a discutient application to rheumatic swellings and in powder (5 to 15 grains) as a diaphoretic.

ORYZA SATIVA.

RICE.

Vern.—*Beng.*—Chál Chául (husked), Dhán; *Hind.*—Dhán, Chával, (husked); *Sans.*—Dhánya, Vrihi; *Bom.*—Bhát, chokha; *Tam.*—Arishi; *Tel.*—Biyyam; *Arab.*—Arruz; *Pers.*—Biranj.

This well-known cereal, natural order *Gramineæ*, occupies the foremost place among the food-crops of India, and forms the staple-food of the people of Bengal, Assam, Burma, and several parts of Madras and Bombay. The total area under cultivation in Bengal has been estimated at 50 millions of acres, and the total annual production of the grain in that Presidency, most of the land yielding at least two harvests, at nearly 15 millions of tons. Dr. Watt has stated that no fewer than 4,000 varieties of rices, wild and cultivated, are known and named in Bengal alone, and that, if the varieties produced in all India were enumerated, they would probably be little short of 10,000. Two principal divisions are known in cultivation, *áman*

or winter rice, and *áus* or autumn rice. Unhusked rice is known as "paddy" (Mal. *padí*), and the husked and cleaned grain, which is exported very largely from Burma, is the rice of commerce.

Its nutritive value is comparatively small, containing as it does only 9 per cent. of nitrogenous, and about 89 per cent. of non-nitrogenous, principles, while the proportion of mineral matters is small. In chemical composition rice approximates to that of the potato, consisting largely of starch. (See Appendix, "Foods of India.") A common kind of alcoholic liquor, known as rice beer (*pachwai*) prepared in a very simple manner by half boiling the grain in water and allowing it to ferment slightly, is in almost universal use by the lower classes in many parts of India. A raw spirit is prepared from this liquor to a considerable extent by a rude process of distillation. Rice is much used in the religious and marriage ceremonies of the Hindús.

Medicinal uses.—Rice is free from laxative properties, and is therefore admirably adapted as a diet for the sick and convalescent, especially in cases where there is a tendency to diarrhœa. The decoction (rice water) is a pleasant demulcent and refrigerant drink in fevers and inflammatory affections of the bowels and kidneys. It may be improved by the addition of a little lemon juice Rice poultice is sometimes used instead of linseed meal.

OXALIS CORNICULATA.

THE INDIAN SORREL.

Vern.—*Beng.*—Amrul, Chuka-tripati; *Hind.*—Amrul; *Sans.*—Amlaloniká; *Bom.*—Bhuí-sarpatí; *Tam.*—Puli-yárai; *Tel.*—Puli-chintaku.

A common garden weed found throughout India, natural order *Geraniaceæ*. The plant has an acid taste, due to

the presence of acid oxalate of potassium to which is due its property in domestic use of removing iron stains from linen.

Medicinal uses.—The LEAVES have long been considered cooling, refrigerant and antiscorbutic. They have also been used for removing corns and other excrescences on the skin. The fresh juice is believed to counteract the intoxication of datura.

OXYSTELMA ESCULENTUM.

Vern.—*Beng.* and *Hind.*—Dudhlata ; *Sans.*—Tiktadugdha.

A climbing plant with edible fruit belonging to the *Asclepiadeæ*, wild in the plains.

Medicinal uses.—A decoction of the PLANT is used as a gargle in aphthous ulcerations of the mouth and in sore-throat. The fresh ROOTS are said to be used in Orissa as a specific for jaundice.

PÆDERIA FŒTIDA.

Vern.—*Beng.*—Gandhabháduli ; *Hind.*—Gandháli, Khip ; *Sans.*—Prasárani ; *Bom.*—Prasáram ; *Tel.*—Savirela.

A twining plant of the natural order *Rubiaceæ*, found in the Central and Eastern Himálaya, Western India and Bengal and Assam. The plant gives off when bruised a marked odour of carbon disulphide. The authors of the *Pharmacographia Indica* obtained a volatile OIL, by distillation of the plant with water, which has the highly offensive odour of the fresh drug. They obtained evidence of the presence of at least two alkaloids which they named provisionally α and β *Pæderine.*

Medicinal uses.—The LEAVES and ROOT are considered wholesome and tonic, and are used to a considerable extent

in Bengal as a constituent of a food given to sick and convalescent patients. The offensive odour is removed in the process of cooking.

The PLANT has had some repute in rheumatism according to Sanskrit writings.

PÆONIA EMODI.

THE PÆONY ROSE.

Vern.—*Hind.*—Ud-sálap, Mamekh ; *Bom.*—Ud-salam.

The TUBERS of this plant and those of *P. officinalis* natural order *Ranunculaceæ*, which are imported from Turkey, have some reputation in uterine disorders, epilepsy, bilious obstructions, convulsions and hysteria.

It was once a common belief, which is probably not yet extinct among the peasantry of Europe, that the pæony root worn round the necks of children had the effect of preventing and curing epileptic attacks.

PANDANUS ODORATISSIMUS.

Vern.—*Beng.*—Keora, Keya ; *Hind.*—Keora ; *Sans.*—Ketaká ; *Bom.*—Kenda ; *Tam.*—Tázhan-chedi ; *Tel.*—Mogali-chettu.

A shrub with fragrant flowers, belonging to the natural order *Pandaneæ*, wild in Southern India, Burma, and the Andamans, cultivated in gardens in Bengal. A perfumed OIL is extracted from the floral bracts by means of sesamum oil, and a fragrant OTTO and water, *Keora-ka-arák*, are also prepared from the bracts. At the instance of Mr. E. M. Holmes, Curator of the Pharmaceutical Society's Museum, Mr. J. G. Prebble lately undertook to distil a quantity of the bracts to ascertain the probable yield of essential oil. None was however obtained, only a small

quantity of fatty matter, and it was assumed that the odorous principle was a stearoptene allied to that contained in elder-flower oil.

Medicinal uses. — The OIL and distilled water are regarded as stimulant and antispasmodic. The former is useful in earache.

PAPAVER RHŒAS.

THE RED POPPY OR CORN ROSE.

Vern.—*Beng.*—Lál-pósta ; *Hind.*—Lal-post, Lálá ; *Sans.*—Rakta-pósta ; *Bom.*—Jangli-mudrika ; *Pers.*—Kóknáre-surkh.

This herb and *P. dubium*, natural order *Papaveraceæ*, are abundant in Kashmír and occasionally to be seen in gardens in the plains. The PETALS are of a bright red colour and contain a colouring principle, attributed to the presence of two acids, *Rhœadic* and *Papaveric*. The CAPSULES on incision yield a milky juice with a slightly narcotic odour. It contains no morphine but a crystallisable, non-poisonous principle named *Rhœadine*. The fresh petals are used in the preparation of *Syrup Rhœados* of the *British Pharmacopœia*, which is given to infants to allay cough, but chiefly used as a colouring agent.

PAPAVER SOMNIFERUM.

THE OPIUM OR WHITE POPPY.

Vern.—*Beng.* — (The Capsules) Posto-dherí ; *Hind.*—(Opium) Afím, Afiyún—(The Seeds) Kashkásh, Post ; *Sans.*—Ahiphena ; *Bom.*—Aphím, appo ; *Tam.*—Abini, Gasha-gasha—(The Capsules) Postaka-tol ; *Tel.*—Abhini, Gasagasálu ; *Burm*—Bhain ; *Arab.*—Afiun, Qishrul-khash-khash ; *Pers.*—Afiún, Khash-khash.

The opium-poppy (*P. somniferum* var. *album*), with white flowers and white seeds, is very extensively grown

in India for the manufacture of opium, and is by far the most important of the indigenous medicinal plants. It belongs to the natural order *Papaveraceæ*. The three main centres of cultivation, embracing great tracts in the respective localities are :—(1) in Behar, with head-quarters at Patna, the produce being known as Patna Opium and usually considered the best; (2) in Benares and the North-West Provinces, with a central depôt at Ghazipur, producing Benares Opium; and (3) in Central and Western India and Rajputana, the source of what is known as Malwa Opium. The two former, called the Behar and Benares agencies, are directly under the administration of the Government of Bengal, and their product is known collectively as Bengal Opium. The opium produced in great quantity in the province of Malwa, which is less esteemed and usually fetches little more than half the price of Patna opium, is grown and manufactured in the Native States without jurisdiction of Government, but a large revenue is derived from a heavy duty levied on the produce brought in transit to a British port for exportation. The opium industry is thus entirely under the monopoly of the Government of India. Opium is also grown and produced in Nepal, Assam and Burma, in the districts outside the limits of British territory, that of Nepal being regularly exported into India.

The area under poppy cultivation for Bengal opium is about 550,000 acres,* the number of licensed cultivators usually exceeding a million. The amount of opium produced annually is about 96,000 maunds (71,000 cwts.) Of this quantity not more than 2,500 maunds (1,850 cwts.)

* In 1893-94 it had fallen, cultivators being discouraged by a series of bad years to 473,000 acres. [*Note.*—The Indian land measure *bigha* (Bengal) is equal to $3\frac{1}{10}$ acres.]

are used in India, the remainder being exported from Calcutta to China and the Straits Settlements. Malwa opium is also exported to China from Bombay.* The revenue accruing from this export trade to China amounts to about £8,000,000 sterling (8 crores of rupees) per annum, about a seventh part of the total revenue of India.

Opium

This is the concrete inspissated juice (or milky sap) by spontaneous evaporation, obtained by scarification of the unripe poppy capsules. The opium of European medicine is obtained from *P. somniferum* var. *glabrum*, grown in Asia Minor, as it has been for the past 2,000 years. The soporific properties of the drug have been known from ancient classic times and from a very remote period in India, possibly from the 7th century, although it is said not to be mentioned in early Sanskrit writings.

The opium of Asia Minor is alone official in the *British Pharmacopœia* for the manufacture of pharmaceutical preparations, although other opiums may be employed as a source of alkaloids.

Indian opium in the manufactured state and in powder and Indian-manufactured alkaloids are used exclusively at the Government Medical Stores in India. Excise opium, the special form of the drug issued for consumption in the country, is generally used in pharmacy in India, although the Pharmacopœial drug is also imported, usually in the dry powder and extract. The alkaloids are imported and are also manufactured to some extent by private concerns.

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* The opium-producing area of all India is probably about one million acres, and the total annual production about 150,000 maunds [over 5,500 tons] the average yield per acre being about 10 seers [20lbs.]—(Watt's *Dict. Econ. Products of India.*)

Indian Opium.

The method of opium extraction and manipulation, as followed at the Government agencies, has been several times described in official publications* and in the pharmaceutical† and medical journals. The latest and best account is that given by Surgn.-Capt. F. P. Maynard, Calcutta, formerly Officiating Factory Superintendent and Opium Examiner to the Behar Agency, in the *Indian Medical Gazette*, February 1894, from which the following extracts are taken :—

"When the poppy flower is in full bloom, about February, the ryots, or *Assamis*, as the licensed opium cultivators are called, first collect the petals by gently removing them from the capsules, never plucking them off forcibly as this would injure the latter. [The petals are subsequently made into the 'leaves' which are used in making the shells of the opium cakes.] The next proceeding is to collect the poppy juice, and this is a very critical operation, depending largely for its success on favourable climatic conditions. Excess of humidity in the atmosphere increases the flow of juice, but at the same time gives rise to a substance termed *pasewha*, a hygroscopic liquid of strong opiate smell and very acrid taste, which, though perfectly pure opium and indeed valuable for its alkaloids, causes the opium containing it to give a higher assay than a hand estimation would lead one to infer, and so giving the cultivator, who is paid for his opium on its consistence a higher price than he deserves : and, moreover, its hygroscopic quality renders it unfit to be used for the interior of the opium cakes.

The *Assamis* turn out in the afternoons armed with scarifiers made of 4 to 6 pointed flat pieces of iron, 4 inches to 6 inches long, bound together with cotton thread. By passing the thread between each piece and binding them up to within $\frac{1}{8}$ inch or $\frac{1}{4}$ inch of the end, a very good scarifier, capable of making limited incisions, is

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* Eatwell, *The Opium Poppy*; Scott, *Manual of Opium Husbandry*.

† Dr. P. A. Weir, *Pharmaceutical Journal*, August 31st, 1889, quoting the *Journal of the Society of Chemical Industry*.

made. With these they incise the capsules vertically in three or four places, and at once a milky juice exudes. This is collected the following morning by means of a small iron scoop and stored in earthen vessels. Each set of incisions yields a grain or two of opium, and the scarifications are repeated as long as any juice flows. As thus collected opium is a granular rose-red liquid containing 46 to 49 per cent. of moisture. It is kept in the shade in earthen vessels tilted to an angle of 45 degrees—to allow the *pasewha* to separate and be removed—and contamination with dust avoided, until it has become inspissated, when it is brought in, at the appointed time, to the District Officer.

The remains of the poppy plant, stems, leaves and capsules are broken up and sent in also as *trash*, which is used for packing the opium sent to China.

[After examination, assay and classification the drug is packed in the three forms in which it is issued.] I.—*Provision* Opium for the China market. This is always sent out [in round balls] at a standard consistence of 75° [*i.e.*, 25 per cent. moisture.] It is packed in chests and despatched to Calcutta, where it is sold at auction to the highest bidder at the monthly sales by the Board of Revenue. II.—*Abkari* or *Excise* Opium for consumption in India. This is the same opium as for provision purposes, but it is dried in shallow wooden trays in the sun and stirred till its consistence reaches 90°, when it is made into [square] cakes, weighing a *seer* [2l-bs.] each, in a hand-press. The cakes are wrapped in three layers of Nepal paper, the inner of which is oiled with poppy oil. III.—*Medical* Opium is all made at Patna and is of two kinds—cakes and powder—and is made from the same opium as I and II, that of the highest consistence and lightest colour being selected. It is spread out in shallow wooden trays in the shade, carefully protected from dust and kneaded by hand every few days until it rises to 90° consistence. This takes months to effect, and it is then pressed in a hand-press into cakes of one *seer* each, wrapped in Nepal paper and issued on indent to the Medical Store-keepers. The powder is simply opium dried to a powder on plates on the steam table and is pure opium at 100° consistence. IV.—Opium not suitable for any of the above purposes, confiscated opium, and *pasewha* is sent to Ghazipur, where it is used for the extraction of alkaloids."

Chemistry of Opium.

The chemical composition of opium is extremely complex. The following 18 alkaloids have been isolated.

ALKALOIDS :

PRIMARY	DERIVED
Morphine.	*Apomorphine.* Oxydimorphine.
Codeine.	Apocodeine. Desoxycodeine.
Thebaine or *Paramorphine.*	Thebenine. Thebaicine
Narcotine or *Anarcotine.*	Cotarnine.
Narceine. Cryptopine. Hydrocotarnine. Pseudomorphine. Protopine. Laudanine. Codamine. Papaverine. Rhœadine. Meconidine. Laudanosine. Lanthopine. Gnoscopine. Xanthaline.	Rhœagenine.

The last mentioned was announced by Messrs. T. and H. Smith, Edinburgh, in 1893, although it was discovered by them twelve years previously. There are also present

ACIDS :

Meconic, Thebolactic, Acetic.

NEUTRAL PRINCIPLES :

Meconine or Opianine, Meconoiosin.

An additional neutral constituent was isolated by Pedler and Warden in 1886 from Bengal opium, but not named. Another principle, *Porphyroxin*, first described by Merck and found in Bengal and Smyrna opiums is interesting as being a means of detection of opium in medico-legal research in cases of suspected poisoning by the drug. Porphyroxin has the property of turning purple in presence of hydrochloric acid, and is at once evident on applying Reinsch's test in the preliminary examination for mineral poisons in the viscera. This test was first applied by the author while additional Chemical Examiner to Government in 1867, and communicated to the International Pharmaceutical and Medical Congress held in London in July, 1881. There are numerous other derivatives of minor interest. Morphine and the more important of the other alkaloids are in combination with meconic acid as meconates; narcotine is present in the free state. Only those in italics in the above list have been investigated therapeutically. The medicinal value of the opium of course depends on the presence of these alkaloids, the proportion of which varies greatly in different opiums. Good Smyrna opium in powder should not yield less than 10 per cent. of morphine. Indian opium is notable for its low percentage of that alkaloid—3 to 5 per cent. is a fair average, although 8 per cent. has been reached,—and large proportion of narcotine*—about 4 to 6 or even 8 per cent., as compared with the Smyrna drug 1 to 2 per cent. A special research undertaken by Dr. B. H. Paul and Mr. A. J. Cownley (*Pharm. Journ.*, 24th December 1892),

* This circumstance has been attributed by the authors of the *Pharmacographia* to "a method of collection which is radically defective: it is scarcely conceivable that the long period during which the juice remains in the wet state—always 3 to 4 weeks—does not exercise a destructive action on its constituents."

with a view to ascertain the applicability of Indian opium for general pharmaceutical purposes* resulted, in a sample of dried Patna opium supplied by Dr. Warden, in a yield of 8·55 per cent. of morphine. A tincture made from it was found to yield on evaporation 21·3 grains of dry extract per fluid ounce, as compared with a sample of Turkey opium which yielded 10·84 per cent. of morphine and 19·8 grains of extractive. The former was equal to 2·74 grains of morphine in each ounce of tincture, and the latter to 3·4 grains, the *British Pharmacopœia* requirement being 3·3 grains. Dr. George Watt, C.I.E., Reporter on Economic Products to the Government of India has recently† re-expressed the desirability that experiments should be undertaken to determine definitely whether the low percentage of morphine in Indian opium is due to the Indian mode of preparation of the drug, or whether the alkaloid is deficient in the juice of the poppy. He suggests that since the crude product is collected by the Natives in *porous* or unglazed earthen vessels and "in consequence a large amount of its fluid contents is absorbed and drained off before it reaches the factory, it is possible that a larger proportion of the morphine may be thus lost than there is any conception of at present."‡

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* Mr. E. M. Holmes, F.L.S., had expressed the opinion at a meeting of the British Pharmaceutical Conference held in Cardiff in 1892 that "there is no reason why India, instead of Turkey, should not supply the whole world with medicinal opium."

† *Pharmaceutical Journal*, Sept. 7, 1895, quoting the *Imperial Institute Journal*.

‡ Dr. Watt further suggests that the objection to the use of Indian opium in European Pharmacy "proceeds more from prejudice than fact, the drug being universally prescribed in India (in the ordinary European preparations and in the same dose) with therapeutic effects identical with the European experience acquired with Turkey opium."

The hydrochlorate, sulphate and acetate of morphine and the alkaloid codeine are manufactured at Ghazipur. Narcotine was formerly prepared, but is not now in demand.

The chemical constitution of the vapour produced when opium is *smoked* has not yet been clearly ascertained. The active principles of the drug are not, or to a very slight extent, volatilizable by heat, although morphine is probably carried into the lungs in finely divided particles with the carbonaceous matter of the smoke.

The poppy juice also contains a peculiar gum, wax, caoutchouc, albumen, sugar, and an undetermined essential oil.

Medicinal uses.—The therapeutics of the drug opium are well and popularly known. It is the most largely used and perhaps the most important agent in the *Materia Medica*. Primarily and in small doses its action is stimulating, secondarily it is narcotic, anodyne and antispasmodic : under its influence the pupil of the eye becomes contracted: in overdoses it is a powerful poison. The internal and external applications of the numerous pharmacopœial and other preparations of opium are too numerous to be detailed here.* Of the alkaloids, morphine is almost purely narcotic. The action of the morphine salts is similar to that exerted by opium generally : they are much administered hypodermically and have less tendency to nausea and headache than the crude drug. Codeine has a feebly narcotic action and is much used to allay cough in phthisis. Thebaine is purely convulsive in its action, resembling strychnine in this respect. Narcotine has no narcotic properties (its newer name, *Anarcotine*, is to be preferred on this account); it was formerly issued by the medical depôts in India and

* See "A Note on the Therapy of Opium and its Alkaloids," by the author, in *Medical Reporter*, Calcutta, October 16th, 1894.

much used as an antiperiodic* in remittent fever and ague, but has now been entirely superseded by quinine and cinchona febrifuge: its use has recently been re-advocated.† Narceine is a soporific. Apomorphine is a powerful expectorant and non-irritant emetic.

Bruised "poppy-heads" are used as a sedative fomentation and poultice. They contain a trace of opium. As grown in India they are much smaller than those imported from and grown in England.

Toxicology.

Opium is sold in common with many other dangerous poisons without restriction in the bazárs throughout Bengal and elsewhere. Cases of opium-poisoning, chiefly suicidal,‡ are of very frequent occurrence in the towns; they are recorded daily in the newspapers, and the number of cases which remain unrecorded in the country districts must be considerable.

A new, prompt and reliable antidote to opium and morphine poisoning is announced by Dr. William Moor of New York (*British Medical Journal*, 22nd June 1895) and recently confirmed by Dr. Raw of Dundee, in permanganate of potassium. It has been shown that this salt completely oxidises the alkaloid and renders it void of toxic properties. One grain of the permanganate has been

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* It has been contended that the preponderance of narcotine over morphine in Indian opium (see the Chapter on "Chemistry of Opium"), is a natural provision against malaria in those districts where it abounds and an argument in favour of its habitual use as a prophylactic.

† Sir William Roberts, M.D., British Medical Association, 1895.

‡ The number reported by the Chemical Examiner to the Government of Bengal during 1894 was 76 (including 14 by morphine) out of 290 human viscera examined, although this does not indicate the actual number of deaths due to opium-poisoning.

found to oxidise exactly one grain of a morphine salt. It is administered in solution in water, repeated two or three times, and in the case of the alkaloid itself or opium and its preparations it is considered advisable to acidulate the antidotal solution with dilute sulphuric acid.

The Opium Habit in India.

The habitual use of opium by a large proportion of the people of India and the policy of Government in encouraging its cultivation and manufacture and export to China have been subjects of much discussion and agitation during many years. The last Royal Commission on Opium—appointed in 1893, to enquire whether the Government of India should not diminish or suppress the cultivation of the poppy in British India, except for medical purposes—has set at rest for a considerable period many questions upon which much opinion and sentiment have been expended. The *consensus* of medical evidence, European and Native, official and private, adduced in India before the Commission showed that opium was a *panacea* with large communities of the people from childhood to old age and their only safeguard in unhealthy environments in many large districts where their poverty and the comparative scarcity of medical men prevented their obtaining medical advice. It was commonly believed to be a prophylactic against malaria, rheumatism, diabetes, endemic diarrhœa, cholera and dysentery, while the belief in its use in the mitigation of suffering and in painful and wasting diseases was all but universal. It further appeared that, although much of the virtue attributed to it, for instance, as tending to longevity, was probably over-estimated, and much of the invigoration produced by it was largely artificial, there was no evidence of extensive moral, physical or

social degradation from its use in any measure comparable with the use of alcohol in other countries similarly as an article of luxury and indulgence. The author, in the course of his evidence, stated that no injurious effects attended its moderate use, and that it was believed to have the desirable effect in old age of arresting or retarding molecular change. The report of the Commission, issued in 1895, was in effect that the non-medical and *quasi*-medical uses of the drug were so interwoven with the purely medical uses, that it would not be practicable to draw a distinction between them in the distribution and sale of the drug, and that it would be impolitic to interpose any obstacle to the easy acquisition by the people of so important a household medicament. The habitual use of opium as a stimulant by young people was generally condemned, and opium-smoking, in the forms of *chandú* and *madat*, though now little practised in India, was considered a disreputable habit.*

It should be noted that the opium habit is practised in India to a much smaller extent than in China. The present system of administration, which has been a State monopoly since the time of the Mogul dynasty and subsequently in the days of the Honourable John Company, was considered satisfactory by the Royal Commission. It has the advantage over private enterprise in precluding to a large extent the possibility of adulteration and corruption.

Other products of P. somniferum.

Poppy SEEDS are exported: they are cooked and eaten in certain curry powders, and are used by the sweetmeat makers. They yield by expression about 50 per cent. of a clear OIL, having a similar composition to linseed oil and

* Report of the Royal Commission on Opium, 1895, Vol. 6, p. 97

drying slowly in the air. Poppy-seed oil is well adapted as a substitute for olive oil in dispensary practice, and it is probably used to adulterate olive oil. It has no narcotic properties, although it is much used as a soothing application.

PARMELIA PERLATA.

Vern.—*Hind.*—Charéla, Pathar-ke-phul.

The above and several other species of the lichen order are sold in the bazárs under vernacular names meaning "stone-flowers."

Medicinal uses.—These lichens have long been regarded in India as astringent and resolvent. They were formerly considered useful as a diuretic, applied in the form of a poultice to the renal and lumbar region.

PAVETTA INDICA.

Vern.—*Beng.*—Kukura-chura; *Hind.*—Pápari, Kankra; *Sans.*—Páppána; *Tam.*—Pavuttay-vayr; *Tel.*—Páputtá-vayrú.

A common shrub, natural order *Rubiaceæ*, found throughout India. The authors of the *Pharmacographia Indica* isolated from the root a bitter glucoside closely allied to salicin.

Medicinal uses.—The bitter ROOT is frequently prescribed by Native physicians in visceral obstructions. It has a purgative action.

PAVONIA ODORATA.

Vern.—*Beng.*—Bálá; *Hind.*—Bálá, Sugandha-bálá; *Sans.*—Bálá, Hrivera; *Bom.*—Kálá-válá; *Tam.*—Perámutiver; *Tel.*—Erra kuti.

An herb of the *Malvaceæ*, with a musk-like odour, wild in the North-West Provinces, the Western Peninsula, Sind and Burma.

Medicinal uses.—The Roots, which also have the odour of musk, are regarded as cooling and stomachic and enter into the composition of a well-known fever drink called *Sadgándha pániya.* The carminative action of the root is believed to be due to the aromatic odorous principle.

PEARLS.

Vern.—*Hind.*—Moti ; *Sans.*—Muktá ; *Tam.*—Muthu-chippi ; *Tel.*—Muti-amu.

The Indian pearl fisheries have been notable from time immemorial. Quite an industry still exists off the coast of Ceylon and the South-Eastern Coast of India, near Tinnevelly and Madura in fishing for the 'pearl-oyster.'

The *Calcarea Carb.* of the homœopaths is the calcined "mother-of-pearl" from the inside of the shell.

Medicinal uses.—The pearl has been held in great repute in Indian medicine for many centuries. It formed an ingredient in several of the complex prescriptions peculiar to Sanskrit *Materia Medica.* Its only virtue was probably in the calcined state as an alkaline ash, chiefly carbonate and oxide of lime, acting as an antacid in heart-burn and bilious affections. It was formerly esteemed by the Hindús in urinary diseases and consumption, and was believed to increase the strength, nutrition, and energy of weak patients. It once had a place in the *British Pharmacopœia.*

PEDALIUM MUREX.

The Burra Gokerú.

Vern.—*Beng.*—Bara-ghókrú ; *Hind.*—Bará-gokhru, Farídbuti ; *Bom.* — Motto-ghókrú ; *Tam.* — Peru-nerunji ; *Tel.* — Pedda-palleru.

A succulent herb, natural order *Pedalineæ,* common in the Deccan, Southern India and Ceylon. The four-angled

spiny FRUIT is easily obtained in the bazárs under the above names. It has the property, in common with the LEAVES, of rendering water or milk mucilaginous when steeped in them, without imparting any colour or taste. The fresh plant and fruit are covered with minute crystalline glands to which this property is attributed. The *chota-gokhrú* is the fruit of *Tribulus terrestris* (q. v.).

Medicinal uses.—The mucilaginous property alluded to above has long been utilized in India, the cold watery infusion being used as an effective demulcent and diuretic in disorders of the urinary system where a mucilaginous agent is indicated. The SEEDS have of late years gained some reputation as remedies for spermatorrhœa and incontinence of urine, in cold infusion of one ounce to a pint, this quantity being administered daily. The LEAVES are used very largely by the common people as a healing application to ulcers.

PEGANUM HARMALA.

HARMAL: SYRIAN RUE.

Vern. — *Beng.* — Isband; *Hind.* — Harmal, Hurmul; *Bom.* — Hurmal; *Tam.*—Shimai-azha-vanai-virai; *Tel.*—Shimagoranti-vittulu; *Pers.*—Ispand.

A shrub of the *Rutaceæ* found in North-Western India, the Punjáb, Sind and Persia, and in the Western Deccan. The SEEDS are imported from Persia and are easily obtainable. They yield a red dye. They also contain two alkaloids, *Harmaline* and *Harmine*, and a soft red-coloured resin with a narcotic odour resembling that of *Cannabis indica*.

Medicinal uses.—The SEEDS may be regarded as narcotic, anodyne, emetic and emmenagogue. The powder, in doses of ½ to 2 drachms, is a good anodyne in asthma, colic and

jaundice, and the watery infusion is similarly useful. A tincture has been found to have mild emmenagogue properties resembling those of ergot. Wounds are fumigated by burning the seeds, the smoke being believed to have antiseptic properties.

PERICAMPYLUS INCANUS.

The ROOTS of this *Menispermaceous* plant are sold in the Bengal bazárs under the name of *Barák-kanta*. They have long been held in great repute among snake-charmers in India as an antidote to the bites of poisonous snakes. An interesting research lately concluded by Surgeon-Lieutenant-Colonel D. D. Cunningham,* has proved that a fluid extract of the roots, when injected into the bitten place, possesses decided remedial power, though it has no general action. It acts by precipitating the poison, and thus rendering it inert when brought into direct relation with it prior to the absorption of the venom into the system generally. The chemical constitution of the drug is under investigation by Mr. David Hooper.

PETROSELINUM SATIVUM.

Syn.—APIUM PETROSELINUM.

THE PARSLEY.

This culinary herb is cultivated in gardens in India. Natural order *Umbelliferæ*. It is interesting as being the source of *Apiol*, a green oily liquid which is distilled from the ROOT. The name is also applied to a crystalline stearoptene contained in parsley OIL distilled from the SEED.

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* Department of the Sanitary Commissioner with the Government of India, 1895.

Medicinal uses.—Apiol has been much recommended in amenorrhœa and in dysmenorrhœa, in doses of 2 to 3 minims, administered in capsules.

PEUCEDANUM GRAVEOLENS.

Syn.—ANETHUM SOWA.

THE DILL: SOWA.

Vern.—*Beng.*—Sowa, Súlpha; *Hind.*—Sowá, Soya; *Sans.*—Satapushpi.

This herb, natural order *Umbelliferæ*, is cultivated in Indian gardens for culinary purposes. The SEEDS yield an essential OIL which is largely used for its valuable carminative properties. Its principal constituent is a fluid hydrocarbon *Anethone*. Another constituent is believed to be identical with the *Carvol* of *Carum carui*. *P. grande*, growing on the Hills of Western India, also yields an essential oil with a more lemon-like flavour than the true dill.

Medicinal uses.—The oil, essence and water of dill are much esteemed in India as carminatives for flatulence in children and in adults.

PHARBITIS NIL.

See IPOMÆA HEDERACEA.

PHŒNIX DACTYLIFERA.

THE EDIBLE DATE.

Vern.— *Beng.*— Gharár-khejur; *Hind.*— Khurmá, Chhúhára; *Sans.*— Kharjjúra; *Bom.*—Chuara, Kurma; *Tam.*—Périch-chankay; *Tel.*—Karjúru-káya; *Arab.*—Khurmál-yábis; *Pers.*—Khurmal-Khushk.

This tall date-palm (*Palmæ*) is cultivated in Sind and in Southern and Western Punjáb, chiefly in the Múltan district. The tree is known generally as *khajúr*. The

FRUIT has long been valued in India, and in some parts used as a food, although it is much inferior to that imported from Arabia and Egypt. The SEEDS have been roasted and ground and used as coffee—"date coffee."

Medicinal uses.—The sweet, pulpy FRUIT is demulcent, expectorant, laxative and nutrient. A paste made of the ground SEEDS is said to be applied in Southern India for opacity of the cornea. A GUM, *kukm chil*, obtained from the tree, is used as a demulcent in genito-urinary affections.

PHŒNIX SYLVESTRIS.

THE WILD DATE PALM: THE DATE-SUGAR PALM.

Vern.—*Beng.*—Khejur; *Hind.*—Khajur, Sendhi, Thalma; *Sans.*—Kharjjúra; *Tam.*—Itchamnar; *Tel.*—Ishan-chedi.

This is the date-palm of India and is widely distributed in India and Ceylon. It is common in Bengal and Behar, regions where the cultivated variety (*P. dactylifera*) is not found. Date-sugar (*dhulua*) is made by evaporating the sap obtained from notches cut in the tree: this soft yellowish sugar is an article of considerable commerce in Jessore. The juice is also fermented and used as an intoxicating drink or toddy (*tari*).

PHYLLANTHUS EMBLICA.

Syn.—EMBLICA OFFICINALIS.

EMBLIC MYROBALAN.

Vern.—*Beng.*—Amlá, Ámlaki; *Hind.*—Aonlá, Àmlaki; *Sans.*—Amalaki; *Bom.*—Avalkati; *Tam.*—Nelli-kái; *Tel.*—Userekí.

A medium sized tree, natural order *Euphorbiaceæ*, common all over Tropical India, found also in Burma. The leaves, bark and the fresh, unripe fruit contain tannin, the latter about 35 per cent. (*Pharmacographia Indica.*)

Medicinal uses.—The fresh juice of the round, acidulous FRUIT is used in combination with that of the other Myrobalans—Chebulic (*Terminalia Chebula*) and Beleric (*T. belerica*) q.v., in the form of a decoction known as *triphala* (three fruits)—as a cooling and refrigerant *sherbet*, and as an astringent medicine in diarrhœa, hæmoptysis, hæmatemesis, and the like. The ROOT also contains an astringent principle.

The fresh *ripe* FRUITS of Emblic Myrobalan are used very largely in India as a laxative, one or two being sufficient for a dose. They have been exported to Europe, preserved in sugar, and are valued as a pleasant laxative for children and made into a confection consisting of the pulp of the fruit freed from the seeds.

PHYLLANTHUS NIRURI and P. URINARIA.

Vern.—*Beng.*—Bhuí-ámlá; *Hind.*—Jarámlá; *Sans.*—Bhumyámalaki; *Bom.*—Bhuí-ávalá; *Tam.*—Kizhkáy-nelli; *Tel.*—Néla-usirika.

These herbs, belonging to the *Euphorbiaceæ*, are common in Central and Southern India, extending to Ceylon. Both plants are used for the same purposes, *P. urinaria* being known by the addition of the adjective *red* to the above vernacular names. The authors of the *Pharmacographia Indica* isolated from the whole plant of *P. Niruri* a bitter neutral principle which they named provisionally *Pseudo-chiratin*, and which has subsequently been investigated and named *Phyllanthin*.

Medicinal uses.—The plant is considered deobstruent, diuretic, astringent and cooling. It is administered in jaundice in doses of a teaspoonful of the dried powdered plant, and in decoction.

PHYSALIS FLEXUOSA.

See WITHANIA SOMNIFERA.

PICRASMA QUASSIOIDES.

Vern.—*Beng.*—Charangi; *Hind.*—Bharangi.

A small tree belonging to the sub-tropical Himálaya. The wood of this tree was many years ago advocated as an indigenous substitute for the true Quassia—the wood of *Picræna excelsa*—of the West Indies. It belongs to the same natural order, *Simarubeæ*. According to the *Pharmacopœia of India* the wood is brought to Bengal from the hills under the name of *Bharangi*, but the authors of the *Pharmacographia Indica* have shown that what is usually sold under this name is the root and stems of *Clerodendron serratum*. An exhaustive research by Dymock and Warden (*Pharm. Journ.*, 20th July 1889) into the actual chemical constitution of the wood of *P. quassioides* as compared with quassia, indicated the presence of a bitter crystalline principle, probably the *Quassiin* of the true quassia. The wood is not so bitter to the taste as ordinary quassia. The structure of both closely corresponds.

Medicinal uses.—The WOOD might be employed as a bitter tonic and stomachic in the same way as the imported drug.

PICRORHIZA KURROOA.

Vern.—*Beng.* and *Hind.*—Kutki, Katki, Karú; *Sans.*—Katuká; *Bom.*—Káli-kutki; *Tam.*—Katuku-rogani; *Tel.*—Katuku-roni.

An herb common on the Alpine Himálaya from Kashmír to Sikkim. Dr. Watt has lately stated* that the plant is

* Indian Medical Congress, December 1894.

very prevalent at altitudes of 10,000 to 15,000 feet, and that its collection and transportation gives employment to a large number of persons. He had seen in Kangra alone during a march of about a week's duration quite 100 mule loads of this drug being carried towards the plains. Natural order *Scrophularineæ*. The drug consists of the small, thin RHIZOME. Considerable confusion has been occasioned through the name *kutki* having been applied to several drugs, chiefly the poisonous Black Hellebore.

The authors of the *Pharmacographia Indica* have isolated a bitter principle, named *Picrorhizin*, and a decomposition product, *Picrorhizetin*, which is believed to exist in small proportion naturally formed in the drug. Cathartic acid was supposed also to be a constituent.

Medicinal uses.—The RHIZOME is bitter and stomachic, in doses of 10 to 20 grains, much used as a popular remedy in dyspepsia. It has been found useful as an antiperiodic in doses of 30 to 40 grains. In both instances it may be advantageously combined with aromatics and in smaller doses may be given to children.

PIMPINELLA ANISUM.

ANISE.

Vern.—*Beng.*—Muhúrí, Mithe-jírá; *Hind.*—Saurif, Anisún; *Bom.*—Ervados; *Tam.*—Sombú; *Tel.*—Kuppi.

This well-known herb of the *Umbelliferæ* is cultivated in Persia and in Northern India. The FRUIT yields an essential OIL—Oil of Anise-seed—which consists mainly of *Anethol* or *Anise* camphor.

Medicinal uses.—The FRUIT and essential OIL are much valued in India as being aromatic, stomachic and carminative. Anise water—*Arak Badian*—is also much used for the same purposes.

PINUS DEODARA.

See CEDRUS DEODARA.

PINUS LONGIFOLIA.

THE LONG-LEAVED PINE: CHÍR PINE.

Vern.—(The Tree) *Hind.*—Saral, Chír, Chíl;
(The Oleo-Resin) *Hind.*—Gandha-biroza, Chír-ka-gond.

This tree is the commonest of the Himálayan *Coniferæ*. It covers great areas in Upper and North-Western India from Afghánistán to Kashmír. Like the Deodar and several other Indian pines it is the source of an OLEO-RESIN which is a product of considerable importance to the people of India. Extending to comparatively low altitudes and therefore more accessible, the resin of this tree is perhaps the most largely collected and made use of. The oleo-resin exudes naturally in small quantity from the bark and is collected in larger quantity by making incisions or notches into the wood. This crude product is heated in order to obtain the RESIN which is usually employed medicinally, the valuable volatile principles being thus dissipated.

A very pure turpentine, Chìr Pine Oil, may be distilled from the oleo-resin, leaving a fine light-brown colophony resin. It is distilled and collected to a small extent from chips of the aromatic wood during the production of Chìr Pine Tar.

Dr. Watt has suggested that the wood might prove suitable for the manufacture of wood-wool, now largely used as a highly absorptive surgical dressing, and for pine-wood paper and other useful products.

Medicinal uses.—The OLEO-RESIN and resin are much used as external stimulating applications, for ulcers, abscesses and the like, and as a basis for plasters and an ingredient

in ointments. Internally they are used to some extent and with some success as a stimulant diuretic in gleet and similar affections. The purified oleo-resin might be given in doses of one to two drachms in emulsion. The tar is employed in chronic bronchitis and phthisis, and is a favourite application in skin diseases.

PIPER BETLE.

Syn.—Chavica Betle.

Betel Pepper.

Vern.—*Beng.*—Pán; *Hind.*—Pán, Tambuli; *Sans.*—Támbula, Nágavalli; *Bom.*—Pán, Vilyadele; *Tam.*—Vettilai; *Tel.*—Nága-valli; *Pers.*—Tamból.

A twining plant of the natural order *Piperaceæ*, cultivated very extensively in the warm and moist parts of India, in Bengal and Orissa, Madras, the North-West and Central Provinces, Bombay and Burma, for its Leaves, which form the basis of the favourite masticatory (*pán-supári*) of the East. The 'betel-vine' is a delicate plant and requires great care and skill in its cultivation. In Bengal, the *pán* garden is carefully enclosed and covered over with wicker work and the prettily trellised plants form an interesting object. The gardens producing the best leaves are said to be those of the banks of the Hooghly.

The practice of chewing the betel leaf is universal among the Natives of India of all classes and castes. Slices of areca nut (*Areca catechu*, q. v., erroneously but popularly called the *betel* nut) with a proportionate quantity of catechu and various spices according to the means and taste of the individual are wrapped in the leaf previously smeared with a little *chunam* or shell-lime. This combination is believed to act as a gentle stimulant, tonic and

digestive. It certainly has a useful action in increasing the salivary secretion, while the antiseptic property of the betel leaf is beneficial, but, as practised, betel-chewing has the unpleasant effect of highly colouring the saliva and staining the teeth.

Betel-leaf contains an aromatic essential OIL (isolated by Kemp, in 1885, as a heavy and a light volatile oil). Treatment of the oil by caustic potash yields *Chavicol*, a phenol having powerful antiseptic properties, said to be five times more powerful than carbolic acid and twice as strong as eugenol. To this "betel-phenol" is due the characteristic odour of the leaves and oil. It is stated in Dr. Watt's *Dictionary of the Economic Products of India* that an alkaloid named *Arakene*, with properties somewhat allied to those of cocaïne, has been extracted from the leaves.*

Medicinal uses.—The fresh LEAVES and the fresh juice of the leaves and the OIL have aromatic, carminative and astringent properties. The warm leaves form a valuable application to the chest in cases of bronchial difficulty, and are applied to the *mammæ* to check the secretion of milk. A little of the juice of the leaf is dropped into the ear to relieve earache. A common practice is to insert the stalk or midrib of the leaf, previously dipped in castor oil, after the manner of a suppository for constipation of children.

It is remarkable that, notwithstanding the extensive use of the leaf in India, and "in spite of repeated efforts to introduce it to European practice, the oil has never given rise to the slightest interest in medical circles." (*Berichte von Schimmel & Co.*, April 1892.) Its employment has

* [Mr. David Hooper, F.C.S., F.L.S., commenting on this statement, in a revisal of the proofs of this work, says that he can find no chemical authority for it.]

been suggested in recent years in inflammation of the mucous membrane of the larynx, and in diphtheria, used as a gargle. It is very powerful and must be largely diluted.

PIPER CHABA.

Syn.—P. OFFICINARUM.

Vern.—*Beng.*—Chai ; *Hind.*—Cháb, Chavi ; *Sans.*—Chaviká ; *Bom.*—Kankala, Chavak.

This plant, natural order *Piperacæ*, is a Native of the Indian Archipelago (Java and Sumatra). Its fruit is the Long Pepper of European commerce, and is imported into Calcutta *viâ* Singapore (see also *P. longum*).

Medicinal uses.—The FRUIT is considered aromatic, stimulant and carminative, occasionally used in medicines for coughs and throat affections. It is obtainable in the bazárs, but is not much used in Native medicine.

PIPER CUBEBA

Syn.—CUBEBA OFFICINALIS.

CUBEBS

Vern.—*Beng.* and *Hind.*—Kábáb-chíní ; *Sans.*—Sugandha-muricha ; *Bom.*—Kábáb-chíní ; *Tam.*—Vál-milaku ; *Tel.*—Chalava-miriyalu ; *Pers.*—Kibabeh ; *Arab.*—Kababah.

A climbing woody shrub or bush, belonging to the natural order *Piperaceæ*, indigenous to Java and Sumatra, and probably cultivated to a small extent in India. The dried, unripe full-grown FRUITS or berries are the cubebs of commerce, and are easily obtainable in the Indian bazárs, being imported from Singapore, and the drug is therefore noticed briefly in this place. The berries somewhat resemble those of black pepper in general appearance, the distinguishing

feature being the short pedicel or stalk attached to the base of the cubebs. The English name is derived from the Arabic, *kababah.*

The characteristic constituent of cubebs is the aromatic volatile OIL which deposits on cooling crystals of *Camphor of Cubebs.* It also contains a resin, consisting partly of *Cubebic Acid* and a crystalline body termed *Cubebin.* The essential oil and cubebin are believed to be inert therapeutically and are eliminated in the preparation of the OLEO-RESIN of cubebs of the *British Pharmacopœia.*

Medicinal use.—Stimulant to the mucous membranes, especially those of the throat and of the urino-genital organs, usually employed in powder, tincture or oleo-resin.

PIPER LONGUM.

LONG PEPPER.

Vern.—*Beng.*—(The Fruit)—Pipul, Pipli. (The Root)—Pipul-múl; *Hind.* (The Fruit)—Pipul, Pipli. (The Root)—Pipli múl; *Sans.*—Pippali; *Bom.*—Pipli, Piper; *Tam.*—Tippili; *Tel.*—Pippali katte; *Arab.*—Dár-filfil; *Pers.*—Maghz-pipal.

This plant, also belonging to the *Piperaceæ,* is ndigenous to Eastern and Southern India from Nepal and Assam to Ceylon, and is cultivated in Eastern Bengal for its FRUIT, which is exported from India to some extent as Long Pepper as well as that of *P. Chaba,* the true long pepper (q.v.). The article consists in either case of the full-grown, sun-dried, unripe fruit, or spike of small fruits, that of the Indian product being somewhat smaller and thinner, but quite similar to that grown in Java, which usually averages $1\frac{1}{2}$ inch in length and about $\frac{1}{4}$ inch in thickness. The former is also less pungent in taste and aroma. The constituents of both fruits are the same as those of *P. nigrum*

(q.v.) *viz.*, an aromatic volatile oil, an acrid oleo-resin and a crystalline substance called *Piperin*. The ROOT of *P. longum*, sliced and dried, is known among the Native druggists as *pipul-múl*, and is believed to possess the virtues of the fruit in a weaker degree.

Sugandhi pippali is the name of a third variety of long pepper which, according to Dymock, is imported from Zanzibar and sold in the bazárs of Bombay.

Medicinal uses.—Stimulant, carminative and alterative tonic: more powerful than black pepper. The powdered *pipul* is given with honey in catarrhal affections, in colic and cholera, and used as an external stimulant application rubbed over painful parts. The fruit is used to some extent as a spice. The root is much used as a stimulant remedy and spice.

PIPER NIGRUM.

BLACK PEPPER.

Vern. — *Beng.*—Gól-marich, Kala-morich ; *Hind.*—Gúlmirch, Mirch, Kali-mirch ; *Sans.*—Maricha ; *Bom.*—Miri, Kala-miri ; *Tam.*—Milágu ; *Tel.*—Miriyálu ; *Mal.*—Kuru-mulaka ; *Burm.*—Sa-yo mai.

The "pepper-vine" (*Piperaceæ*) is a perennial, climbing shrub indigenous to the Malabar and Travancore coasts, whence, according to the *Pharmacographia*, it has been introduced into Sumatra, Java, the Malay Peninsula, Siam, the Philippines and the West Indies. The plant is extensively cultivated in South Western India, and the FRUIT is very largely exported from Madras, Bombay, Karachi and Calcutta, forming a considerable portion of the world's supply of black pepper. The principal exporting centre for the Malayan and West Indian product is Singapore.

The spice has been exported from India from about the 11th century, "and was for many ages the staple article of trade between Europe and India" (*Pharmacographia*) having been to a large extent the nucleus of the commerce now existing between these two continents.

The globular berry-like fruit is collected when fu grown but unripe, when it begins to turn from green to red: it assumes the blackish-brown colour and wrinkled appearance of the commercial article on drying in the sun.

The chemical constituents of black pepper are 2 to 8 per cent. of a crystalline substance called *Piperin*, which is the active principle, having the same chemical composition as morphine, although almost devoid of taste, colour or smell, and which is resolvable into *Piperic Acid* and a colourless liquid alkaloid, *Piperidine* (now believed to be also present in the fruit): an acrid oleo-resin to which the well-known pungent taste and aromatic odour is due, and an aromatic essential oil, starch and gum.

White Pepper,

(Piper Album) consists of the Fruits of *P. nigrum* divested of the dark outer skin, which is easily removed by soaking in water, the berries being subsequently dried and bleached in the sun.

This treatment removes some of the pungent and acrid principles, these being contained chiefly in the pericarp or outer coat of the fruit. The vernacular names are as above with the prefix *safed* or *sada* (white).

The popular use of the commercial varieties of pepper as culinary spices is well-known, and would appear to be extending to all countries of the world.

Medicinal uses.—Black pepper has held an important place in Indian medicine for many centuries, a popular

Sanskrit prescription having been a confection of pepper. It is still regarded and much used as an aromatic stimulant and carminative, useful in dyspepsia and flatulence, in hæmorrhoids, and occasionally employed as an antiperiodic in obstinate fevers. Externally it is valued as a rubefacient and stimulant to the skin. It is little used in modern European medicine except as an ingredient of several of the confections of the *Pharmacopœia*, that of pepper being used chiefly in the treatment of hæmorrhoids. Piperin is official in the *United States Pharmacopœia*, and used as a febrifuge in doses of 2 to 8 grains.

Adulterations.—Black pepper, which is always exported unground, is seldom adulterated in India. The berries of *Embelia Ribes* (q.v.) are occasionally found as an admixture, sometimes accidental. Powdered black pepper is believed to undergo a considerable amount of sophistication in commerce.

PISTACIA INTEGERRIMA.

Vern.—(The Galls)—*Beng.*—Kakra-sringi; *Hind.*—Kákrasingí; *Sans.*—Karkata sringi; *Bom.*—Kákrasingi; *Tam.*—Kakkata shingi; *Tel.*—Kákara-shingi.

The drug sold in the bazárs of Northern India under the above names consists of the gall-like excrescences formed by insects on the leaves and petioles of this tree (natural order *Anacardiaceæ*) found on the mountain ranges of the North-West from Peshawar to Simla. The GALLS are hard, hollow, irregular, greyish externally and yellow internally, usually 1 to 1½ inch long, sometimes much larger and shaped like a horn, hence the name *singí*.

The galls have been examined by Mr. J. G. Prebble (*Pharmacographia Indica*) and found to contain 75 per cent. of tannin.

Medicinal uses.—The powdered GALLS have been given as an expectorant in coughs and phthisis, in doses of 20 grains combined with demulcents, and in diarrhœa with other astringents.

PISTACIA LENTISCUS.

THE MASTICHE TREE.

Vern.—*Hind.*—Rúmí mastikí ; *Pers.*—Mastika-i-rumi.

The mastiche or mastic RESIN, imported in small quantity into India from Asia Minor, through Persia and Afghánistán, is an exudation obtained by incision from the bark of this tree. Natural order *Anacardiaceæ.* It is used as a masticatory by persons of high rank in India to preserve the teeth and sweeten the breath. Mastiche was formerly employed to some extent in medicine, but is now regarded as having little therapeutic value. It is used by dentists for filling carious teeth.

PISTACIA TEREBINTHUS.

THE TEREBINTH OR CHIAN TURPENTINE TREE.

BOMBAY MASTICHE.

Vern.—(The Resin)—*Hind.*—Mastáki, Kabulí-mastáki, Khinjak.

Three varieties of this tree, also belonging to the *Anacardiaceæ,* indigenous to Sind, Belúchistán and Afghánistán—*P. mutica, P. cabulica* and *P. Khinjuk,* now generally regarded as one species—yield oleo-resins allied more or less to that of true mastiche and used in India as substitutes for it. The OLEO-RESIN exudes, like mastiche, from incisions in the bark and is of a darker colour than the true drug, the finer qualities (in tears when fresh)

usually running into a pasty mass which becomes hard and brittle on exposure to the air. It is known as Bombay or East Indian mastiche, and is identical with the product known as Chian turpentine, although this drug, as used in medicine, is collected solely from *P. Terebinthus* growing in the Island of Scio (Chio) in the Mediterranean.

Chian turpentine consists of a resin and an essential oil as contrasted with mastiche which consists essentially of two resins.

Medicinal uses.—Bombay mastiche is not used medicinally in India, although the better qualities might be used in the same way as Chian turpentine. The latter had almost fallen into disuse in European medicine until revived some years ago as a remedy in uterine cancer, given in emulsion or in a pill with sulphur in doses of 5 to 10 grains.

PISTACIA VERA.

THE PISTACHIO-NUT TREE.

Vern.—*Beng.* and *Hind.*—Pistá ; *Pers.*—Pisteh.

The tree, natural order *Anacardiaceæ*, grows in the forests of Syria and Persia, and is cultivated to some extent in Afghánistán. The FRUIT or nuts are brought to India in considerable quantities by the Kabul traders along with asafœtida and other drugs. The pistachio nuts are used as food by some high class Indian people and regarded as very nourishing. They also enter into certain confections. The fruit somewhat resembles that of the olive, ovoid and reddish externally, astringent and terebinthinate, with a kernel which yields a sweet, aromatic oil. Galls are formed on the leaves which have been found to contain 45 per cent. of tannin allied to gallo-tannic acid, besides gallic acid and 7 per cent. of a resin or oleo-resin to which their

terebinthinous odour is due (*Pharmacographia Indica*). They are known as *Gul-i-pisteh* or *Bazghanj*, and are also imported into India.

Medicinal uses.—The NUT has been regarded as tonic and useful in debility. The OIL expressed from it is used as a demulcent. The GALLS are useful as an astringent.

PISTIA STRATIOTES.

Vern.—*Beng.*—Toká-páná; *Hind.*—Jal-kunbhi; *Sans.*—Kumbhiká; *Bom.*—Prashní; *Tam.*—Agasa-tamaré; *Tel.*—Antara-támara.

An aquatic stemless plant, belonging to the natural order *Aroideæ*, growing on the surface of the water in tanks and stagnant pools in Bengal and also found on the sea-shore. The ash of the plant, known as *páná* salt, has some repute in some parts of India as an application for ringworm. It has been found by Dr. Warden to consist chiefly of potassium chloride and sulphate.

PLANTAGO OVATA.

Syn.—P. ISPAGULA.

ISPAGHÚL OR SPOGEL SEEDS.

Vern.—*Beng.*—Isabgúl, Ispaghúl, Eshopgól; *Hind.*—Isabghúl, Ispaghúl, Issufgúl; *Bom.*—Isapghol; *Tam.*—Ishappukol-virai; *Tel.*—Isapagála-vittulu; *Pers.*—Ispaghúl, Isparzah.

A Persian herb, found also in North-Western India, the Punjáb and Sind: cultivated to a small extent in Bengal. Natural order *Plantagineæ*. The minute boat-shaped SEEDS, of a pinkish-grey colour, are well-known and easily obtainable in all the bazárs under the above vernacular names, being for the most part imported from Persia.

They were made official in the *Pharmacopœia of India*, and are much valued in India for their demulcent and emollient properties. Steeped or boiled in water they become coated with an abundant, adherent, bland mucilage. The seeds of several other species of the same genus exhibit a similar property, those of *P. amplexicaulis* being the brown variety of the drug sometimes met with in the bazárs.

Medicinal uses.—A decoction of the SEEDS (about 1 in 60) is used in India as a cooling demulcent drink. Their more important use, however, is as a valuable remedy in chronic diarrhœa and dysentery, especially in that peculiar form of intestinal irritation known as "hill" diarrhœa. The medicine has been given with advantage in powder, in doses of ½ to 2 drachms, sometimes mixed with sugar, although the best method of administration is in decoction (1 in 40), or about one drachm of the seed after soaking in water. Surgn.-Lieut.-Col. C. H. Joubert has stated* that he has found Ispaghúl to be a very valuable remedy in the conditions indicated, given in spoonful doses of the whole seed, steeped for 15 or 20 minutes in water, the resulting mucilaginous mass being swallowed. Many of the swollen seeds pass out whole with the motions, and he believes their action to be mechanical as well as astringent to the intestinal ulcers.

The remedy is perfectly tasteless, and therefore equally suitable for children as adults and so safe that it may be given almost *ad libitum*. While practically non-astringent it forms an admirable adjunct to astringent medicines, with which, however, it should not be combined. It has a beneficial action in other inflammatory affections of the

* Watt's *Dictionary of the Economic Products of India*.

mucous membrane of the alimentary canal, as in gastric catarrh.

The bruised seeds moistened with water form a good emollient poultice.

PLUMBAGO ROSEA.

Vern.—*Beng.*—Lal-chitá, Rakto-chitra ; *Hind.*—Lál-chítarak, Lal-chitrá ; *Sans.*—Raktachitraka ; *Bom.*—Lal-chitra ; *Tam.*—Shivappu-chittira ; *Tel.*—Yerra-chitra.

A plant commonly cultivated in gardens in India. Natural order *Plumbagineæ*. The ROOT has vesicant properties when applied to the skin, and it has been proposed as an efficient substitute for cantharides. The bruised root mixed with oil is used as a rubefacient application in rheumatism. Taken internally it is a powerful acro-narcotic poison. The records of the Chemical Examiner's Departments show that it is employed to procure criminal designs.

The root contains a crystalline principle, *Plumbagin*, which is the active constituent.

PLUMBAGO ZEYLANICA.

Vern.—*Beng.*—Chitá, Chitruk safaid ; *Hind.*—Chitrá, Chitarak ; *Sans.*—Chitraka ; *Tam.*—Chittira ; *Tel.*—Chitra-múlam.

A plant closely allied to the former, growing wild and cultivated as a hedge plant in Bengal and Southern India. *P. rosea* is sometimes regarded as a cultivated variety of the plant under notice. The ROOT contains the same active principle and has similar properties although in a smaller degree. It is in popular use as a counter-irritant and vesicant. It was formerly and is still used as a stimulant

adjunct to other medicines in small doses of the powder. Like the root of the former species it is powerfully poisonous and its use is attended with great danger.

PODOPHYLLUM EMODI.

INDIAN PODOPHYLLUM.

Vern.—*Hind.*—Pápra, Pápri, Bhavan-bakra, Bakra-chimyaka.

A herbaceous plant of the natural order *Berberideæ*, indigenous to the temperate Himálaya from Sikkim to Kashmír, plentiful near Simla, usually at altitudes above 9,000 feet. It is more plentiful on the Western Himálaya than on the Eastern ranges. The plant is closely allied in botanical characters to the American species, *P. peltatum*, the source of the Resin of Podophyllum of the *British Pharmacopœia ;* the lobed leaves have the same appearance that has given the name to the American plant of "duck's foot"; the scarlet red pulpy fruit, of the size and shape of a pigeon's egg, is eaten by the hill tribes as the "May-apple" (fruit of *P. peltatum*) is in America, and the RHIZOME or underground stem and rootlets contain similar medicinal principles.

The resinous constituents of both species, called collectively *Podophyllin*, are obtained by re-percolation of the dried and powdered rhizomes, precipitation by acidulated water and drying at a low temperature. Podophyllin is an amorphous powder, usually of a bright brownish yellow colour, soluble in rectified spirit and in aqueous ammonia. It has been found, according to a research made by Podwissotzki (1882) that the physiologically active portion of podophyllin consists of an amorphous principle soluble in alcohol, isolated from a chloroformic extract of the root

and named *Podophyllotoxin.* It contains none of the fatty or colouring matters of the official resin, and has been administered as a purgative in doses of $\frac{1}{10}$ to $\frac{1}{8}$ grain. Podophyllotoxin is composed of a bitter, crystalline, neutral body, *Picropodophyllin,* probably held in solution by *Picropodophyllic Acid.* The resin also contains *Podophyllic Acid,* which is inert, a yellow colouring matter, *Podophylloquercetin* (not berberine as formerly supposed) and fatty matter.

Mr. David Hooper showed in 1888 that Indian podophyllum yielded 12 per cent. of resins as compared with 4 per cent. yielded by the American drug. Practical working averages are about 10 and 5 per cent. respectively. Following a communication to the *Pharmaceutical Journal* by Dymock and Hooper (26th January 1889) introducing *P. emodi* as a desirable addition to the *Materia Medica,* and partly through interest being aroused in it by Dr. George Watt, C.I.E., Reporter on Economic Products to the Government of India, considerable quantities of the drug were exported from India, and found a ready market in London.

In a paper contributed to the British Pharmaceutical Conference, held in Edinburgh in 1892, Mr. John C. Umney reported the results of a series of experiments undertaken with a view to determine whether an occasional uncertainty of action attributed to the podophyllin of *P. emodi* was due to a difference in chemical constitution as compared with the official resin. Parallel analyses by Podwissotzki's method showed that while the rhizome of *P. emodi* yielded nearly double the amount of resin yielded by *P. peltatum,* the former contained only about half the quantity of podophyllotoxin, and consequently of picropodophyllin, to which the value as a cathartic was believed to

be due. On the other hand, an analysis published by Mr. F. A. Thompson, Ph. G. (*Am. Journ. Pharm.*, May, 1890) shows the percentage of podophyllotoxin as fully 25 per cent. higher than the average amount found in the podophyllin of *P. peltatum*. Active commercial interest in the Indian drug has somewhat waned since these conflicting results have been published, but a more extended chemical and physiological investigation is desirable before the claims of *P. emodi* to recognition as an additional official source of podophyllin resin can be altogether set aside.

The plant is very plentiful and easily accessible on the Himálaya. Dr. Watt reports* that the number of persons who make a living by collecting and exporting drugs from the higher ranges of Kangra and Kúlú, where it abounds, is very great, and that if European merchants wished to procure it they would find little difficulty in organizing an agency.

Medicinal uses.—It is remarkable that the medicinal value of the podophyllum should have escaped the notice of the Indian people, who are now, however, beginning to recognise the purgative property of the roots. Podophyllin Resin is one of the most popular of modern medicines It is a powerful biliary purgative, its action somewhat corresponding to that of mercury, hence the name "vegetable calomel." It is an active cholagogue and aperient in doses of $\frac{1}{8}$th to 1 grain, usually in pills, alone or combined with other hepatics and purgatives or in solution in alcohol (*Tinctura Podophylli*, B. P.) The rhizome itself is not employed in medicine.

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* Indian Medical Congress, 1894. Presidential Address in the Section of Pharmacology.

PONGAMIA GLABRA.

Vern.—*Beng.*—Karanja, Karmuj; *Hind.*—Karanj, Kiramál; *Sans.*—Karanja, Naktamála; *Tam.*—Ponga, Pungam-maram; *Tel.*—Kánuga, Ranagu; *Bom.*—Karanj; *Mal.*—Pongam.

A moderate sized tree of the *Leguminosæ*, common all over India from the temperate Himálaya to Central and Southern India and Ceylon. The SEEDS yield on expression about 25 per cent. of a thick, yellowish brown bitter OIL of specific gravity about 0·935, which is used for illuminative purposes and is likely to prove of considerable value medicinally.

Medicinal uses.—Pongamia OIL (known in some parts also as *hongé* oil) has marked antiseptic, cleansing and healing properties when applied to skin diseases, in scabies, herpes and the like. An embrocation made of equal parts of the oil and lime or lemon juice is useful in rheumatism, and the same combination has proved efficacious as an application in psoriasis and pityriasis. The juice of the STEM, LEAVES and ROOT appear to possess similar properties.

POTASSII NITRAS.

NITRATE OF POTASSIUM.

Vern.—*Beng.*—Sórá; *Hind.*—Shórá, Suriakhar; *Bom.*—Shóra mitha.

This salt, known commonly as nitre or saltpetre, is produced very largely as a natural efflorescence on the surface of the soil in many parts of India.

In Bengal it occurs as a thin white crust not unlike frost-rind, chiefly in the Behar district, whence the partially purified salt is brought down in great quantities to Calcutta for export, while it is also collected in the North-West Provinces, throughout the course of the Ganges, from land

which has been inundated during the rains, and in the Punjáb.

The Native saltpetre refiners, or *leonahs* as they are called, commence operations soon after the rains by collecting the efflorescence from the land and from mud-heaps, mud buildings, and other places on which it has formed. The saline earth is now subjected to a process of solution and filtration through a crude mud filter. The solution, which has now been freed of earthy matters, contains a certain proportion of nitrate of lime, to remove which it is passed through layers of wood-ashes and ashes of plants (impure carbonate of potassium), carbonate of lime being deposited, and the nitrate of potassium solution evaporated and crystallized. The impure nitre is now known as *dhoah* and contains about 45 to 70 per cent. of the actual salt, the remainder being sulphate and chloride of sodium and insoluble matter. It is again dissolved and crystallized before it is sent, under the name of *shora kalmi* (refined) to the bazárs for sale, while it is further re-crystallized in Calcutta and elsewhere before being sold for use.

Indian saltpetre formerly constituted the whole of the world's supply of that valuable chemical substance, the trade having been a profitable monopoly of the East India Company for over a century. It is still very largely exported from Calcutta, although it has a formidable rival in Chilian saltpetre, and that produced by chemical manufacture. It is much used in India for some industrial purposes, and saltpetre is not imported except for medicinal purposes.

Medicinal uses.—In solution, diuretic and diaphoretic, irritant if given in the solid form or in concentrated solution: locally as a refrigerant lotion. Inhalation of the fumes of bibulous papers soaked in a saturated solution

of the nitrate and dried, sometimes combined with datura and other drugs, and burned, often affords marked relief in asthma and other spasmodic affections, the virtue being believed to reside in the oxygen which the salt evolves on ignition or strongly heating.

PRUNUS AMYGDALUS.

Syn.—AMYGDALUS COMMUNIS

THE ALMOND.

Vern.—*Beng.*—Biláti-badám; *Hind.*—Badám; *Sans.*—Bádámitte; *Bom.*—Bádam; *Tam.*—Vádam-kottai; *Tel.*—Bádam vittulu; *Pers.*—Bádám.

The almond tree is a Native of Western Asia, and has now become naturalized in the Mediterranean countries of Europe and Africa. It is cultivated in the Punjáb, Kashmír and Afghánistán, whence the FRUIT (almond in shell) is exported in large quantities to India. The natural order is *Rosaceæ*. The almond tree is very frequently cultivated for ornamental purposes in the plains and the fruit forms but does not ripen.

Two varieties of the tree are recognised—*dulcis* and *amara*—yielding respectively sweet and bitter almonds, but without other botanical difference. The distinction in the fruits may be made in the above vernacular names by the addition of the words "sweet" or "bitter." Both varieties yield to expression about 50 per cent. of a fine, clear, yellowish, fixed OIL, contained in the kernel, with an agreeable flavour and no odour. They also contain a neutral principle called *Emulsin* or *Synaptose* and the bitter almond in addition a crystalline glucoside, *Amygdalin*. These bodies do not react in the dry state, but in the presence of water the emulsin acts as

a ferment on the amygdalin, producing benzoic aldehyd (essential oil of bitter almonds), hydrocyanic or prussic acid and glucose. The essential oil, thus produced only from bitter almonds and in the presence of water, is prepared commercially by treating the almond cake, left after expression of the fixed oil, with water and distilling. It is highly poisonous, due to the presence of the prussic acid, which is, however, usually removed by distillation with lime and sulphate of iron. The tree yields a gum known as *Badam-i-gond* which is exported from Bombay and occasionally used in place of tragacanth.

Medicinal uses.—Almonds *per se* are little used in medicine. The white emulsion produced when the blanched and powdered kernels are triturated with water is used as a vehicle for medicines. The essential oil is much employed as an agreeable flavouring agent. Almond meal has been recommended as a suitable diet for diabetic patients, as it contains no starch. The burnt shell (almond shell charcoal) is used in India as a tooth powder.

PRUNUS COMMUNIS.

VAR.—INSITITIA.

THE BOKHARA PLUM.

Vern.—*Beng.* and *Hind.*—Alú, Alú-bokhára, Alúcha.

The FRUIT of this tree, which belongs to the natural order *Rosaceæ*, and grows on the Western Himálaya, is common in the Indian markets, being brought down by the Afghan traders, and largely consumed by the rich in various forms of *chatni*. It acts as a cooling laxative and is regarded as suitable for all the purposes to which the English plum is put, as in the preparation of Confection of Senna.

PSIDIUM GUYAVA.

VAR.—PYRIFERUM (white) AND POMIFERUM (red).

THE GUAVA.

Vern.—*Beng.*—Goáchhi-phal, Piyárá; *Hind.*—Ám, Amrút; *Bom.*—Perala; *Tam.*—Goyyá-pazham; *Tel.*—Jám-pandu.

This tree, natural order *Myrtaceæ*, cultivated nearly all over India and common in Bengal, is much valued on account of its pleasant fruit which forms when stewed the well-known guava jelly. The STEM-BARK has attracted some attention as an astringent, and has been found to contain about 25 per cent. of tannic acid.

Medicinal uses.—The root-bark has been recommended in chronic infantile diarrhœa, in decoction of ½ oz. in 6 oz. of water, boiled down to 3 oz., and given in teaspoonful doses: and as a local application in prolapsus ani of children.

PSORALEA CORYLIFOLIA.

Syn.—TRIFOLIUM UNIFOLIUM.

BABCHÍ SEEDS.

Vern.—*Beng.*—Latakasturi, Bábachi, Hakúch; *Hind.*—Babchí, Bábachi, Bhávanj; *Sans.*—Vákúchi; *Bom.*—Bawachí; *Tam.*—Karpo-karishi; *Tel.*—Bhavanchi-vittulu.

The SEEDS of this common weed are ovate, very small, of a dark brown colour, with an aromatic and bitter taste. The plant belongs to the natural order *Leguminosæ*, and is common in Bengal and all over the plains of India. The seeds yielded the authors of the *Pharmacographia Indica* a colourless essential oil, lighter than water, and which possessed in a marked degree the odour of the

drug, and a crystalline colouring matter. The constituents were found to be partly soluble in water, alcohol and ether.

Medicinal uses.—The author communicated to the International Pharmaceutical Congress held in London in 1881, the results of a series of experiments he had conducted with an oleo-resinous extract of the SEEDS, diluted with chaulmúgra oil, as an application in cases of leucoderma or white leprosy. The course of the treatment was thus described:—"After application for some days the white patches appear to become red and vascular; sometimes a slightly painful sensation is felt. Occasionally some small vesicles or pimples appear, and if these be allowed to remain undisturbed, they dry up, leaving a dark spot of pigmentary matter, which forms, as it were, a nucleus. From this spot, as well as from the margin of the patch, pigmentary matters gradually develop, which ultimately coalesce with each other, and thus the whole patch disappears. It is also remarkable that the appearance of fresh patches is arrested by its application." (*Pharm. Journ.*, 24th Sept. 1881.) The late Brigade-Surgeon W. Dymock, commenting on this mode of treatment, stated that in the hands of other observers only negative results had been obtained. The author has found, however, as the result of many years experience in the treatment of the disease, which is very prevalent in Bengal, that he has no reason to alter his original announcement of the merits of this drug as a reliable specific in the conditions indicated. It may be noted that the treatment is more successful in young persons than in older patients where the circulation is slower and the pigmentary matter in the blood smaller in quantity. The ointment may be prepared by combining one part of an alcoholic extract of the seeds with two parts of

chaulmúgra oil and two parts of lanoline. The proportion of the active ingredient may be increased if the action is delayed.

PTEROCARPUS MARSUPIUM.

THE INDIAN KINO TREE: MALABAR KINO.

Vern.—*Beng.*—Pít-sal; *Hind.*—Bija, Bijasár; *Bom.*—Bibla, Honné; *Tam.*—Vengai-maram; *Tel.*—Peddagi.

A large tree of Central and Southern India and Ceylon, belonging to the natural order *Leguminosæ*.

It is the official source of the kino of the European Pharmacopœias and that of the United States. Kino is a natural exudation obtained by incisions in the trunk, inspissated without artificial heat. It occurs usually in small angular, dark brownish-red, glistening brittle fragments, with a very astringent taste. The kino trees are carefully reserved by Government both in the Malabar and Madras forests and are leased out to collectors.

The principal constituent of kino is a peculiar tannin, *Kino-tannic Acid*, usually believed to be identical with the tannin of catechu (catechu-tannic acid) and distinct from gallo-tannic acid. By boiling an aqueous solution of kino-tannic acid a precipitate of *Kino-red* is obtained: treated with dilute acid a similar precipitate occurs and crystals of *Kinoïn* separate. By dry distillation kino yields *Pyro-catechin* and heated with caustic alkalies, *Protocatechuic Acid* and *Phloroglucin*, similar products to those afforded by catechu.

Malabar kino is little used in Native medicine in India: it is reserved for export to Europe, Bengal or Butea kino (q.v.), an inferior product, taking its place.

Medicinal use.—Kino is a simple astringent, administered in diarrhœa, somewhat milder in action than catechu.

PTEROCARPUS SANTALINUS.

RED SANDERS OR SANDALWOOD.

Vern.—*Beng.*—Rakto-chandana; *Hind.*—Rukhtu-chandan, Lál chandan; *Sans.*—Raktachandana; *Bom.*—Ratánjli; *Tam.*—Shen-shandanam; *Tel.*—Rakta-gandham; *Pers.*—Sandale-surkh.

A small tree, natural order *Leguminosæ*, belonging to the forests of Madras and Mysore and the Coromandel and Malabar Coasts of Southern India.

The felling of the trees is under strict Government control and yields a considerable revenue. The wood, formerly called by the Dutch "calliature wood," is exported chiefly from Madras in large logs consisting chiefly of the lower portion of the tree trunk and roots, much of the actual wood being retained in India for ornamental wood-work.

The chips or raspings of the bright—red heart—WOOD, as found in the pharmacies, are the red sanders wood (*Lignum Pterocarpi*) of the Pharmacopœias.

Although misnamed "red sandalwood" and described in Sanskrit writings as a variety of the true sandalwood (*Santalum album*), q.v., the products are quite distinct.

Red sanders wood contains a red, crystalline, resinoid colouring matter, insoluble in water, soluble in alcohol, named *Santalin* or *Santalic Acid*. From the wood has also been isolated a colourless principle, called *Santal*, which is capable of being converted into what is believed to be resorcin. Another crystalline body, *Pterocarpin*, has also been isolated.

The wood is not employed medicinally. In pharmacy it is a colouring ingredient in the compound tincture of lavender.

PUNICA GRANATUM.

THE POMEGRANATE.

Vern.—(The Fruit)—*Beng.*—Dalím, Dárim, Anár; *Hind.*—Anár, Darim; *Sans.*—Dádima-phalam; *Bom.*—Dalímba, Anara; *Tam.*—Mádalaip-pazham; *Tel.*—Danimma-puvvu; *Arab.*—Rumman; *Pers.*—Anar.

The pomegranate tree, natural order *Lythraceæ*, is wild in Persia, Afghánistán and Belúchistan and cultivated chiefly for its FRUIT nearly all over India. The fruit is always plentiful in the cold weather in the bazár in Calcutta, that grown in the plains being, however, much inferior to that brought down by the Kabúli fruit merchants. The fruit is usually as large as a good sized apple, with a hard, leathery rind of a brownish-red colour externally enclosing very numerous yellowish seeds embedded in a pellucid red pulp. It is occasionally exported whole, more commonly in portions of the rind. The pomegranate fruit has been esteemed in the East from a very remote period as is evidenced by the numerous references to it in Scripture. In India it has been used as food and medicine for centuries. The RIND of the fruit and the ROOT-BARK are the officinal portions, the latter having been adopted in many of the Pharmacopœias. The root-bark is not usually sold in the drug shops in India, being usually obtained fresh as required.

The principal chemical constituent of the rind of the fruit is tannin, which it may contain to the extent of 22 to 25 per cent. The root-bark contains 20 to 25 per cent. of the same astringent principle, considered to be a peculiar variety and named *Punico-tannic Acid*, which, when boiled with dilute sulphuric acid, is resolvable into *Ellagic Acid* and sugar. According to the authors of the *Pharmacographia*, punico-tannic acid is accompanied by

common tannic acid, yielding by means of sulphuric acid, gallic acid, which appears sometimes to pre-exist in the bark. Mannite is also obtainable from the bark, which was believed by the same authors to be the *Punicin* or *Granatin* of former observers. It has been stated by an American investigator (J. Culley, *Year Book of Pharmacy*, 1894, p. 63) that, as the result of several experiments, there is sufficient agreement in the properties and composition of punico-tannic acid with gallo-tannic acid obtained from galls, to justify the conclusion that these two tannins are identical.

A liquid volatile alkaloid, named *Pelletierine* (Tanret, 1878) has been isolated from the root-bark, to which the medicinal value of the bark as a tænifuge is attributed. Another alkaloid, *Isopelletierine*, was subsequently discovered by the same investigator.

Medicinal uses.—The pomegranate RIND, known as *dalím chál* or *naspal* in the bazár, is a valuable astringent in diarrhœa and dysentery, usually administered in decoction (1 in 10) with the addition of cloves or other aromatic and opium. The ROOT-BARK is very generally recognised, and has long been used in India, as a reliable tænifuge or specific for the expulsion of tænia or tape-worm. It should be obtained *fresh*, and is administered in decoction, which is best made by digesting two ounces of the bark and a little clove or other aromatic in a pint of cold water for six hours and reducing the strained liquor by evaporation to ten ounces. This quantity should be given fasting in doses of two ounces at intervals of two hours, and preceded and followed by a full dose of castor oil or compound powder of jalap with the addition of two grains of calomel, for an adult. This treatment rarely fails in effecting the removal of the organism, together with the

head, so that there is no relapse. There is little of the nausea usually experienced in the use of the drug as much of the tannin that is extracted in the usual method of boiling remains in the bark. A fluid extract of the fresh bark in doses of half an ounce, repeated, is equally effectual. The alkaloid, pelletierine, and its compounds have also been used as anthelmintic and tænicide, the most suitable being the tannate which is difficultly soluble and therefore not readily absorbed, and is administered in doses of 3 to 8 grains, fasting, and followed by a purgative.

The acid, saccharine juice of the fresh fruit is much esteemed in India as a cooling beverage in fevers and sickness, and it is one of the *phala-traya* or favourite fruit triad, of Sanskrit writers. The FLOWERS are said to be also used as an astringent where they are obtainable.

QUERCUS INFECTORIA.

OAK GALLS.

Vern.—*Beng.*—Majuphul; *Hind.*—Mázúphal, Múphal; *Sans.*—Majuphal; *Bom.*—Maiphala; *Tam.*—Machakai; *Tel.*—Mashikáya; *Pers.*—Mazu.

The tree bearing the oak galls of commerce is a native of Greece, Asia Minor and Syria, extending to Persia, whence they are imported into India in considerable quantities, as they have been from an early period. They are therefore noticed briefly in this place.

The oaks belong to the natural order *Cupuliferæ*. The GALLS are excrescences caused by an *Hymenopterous* insect (*Cynips Gallæ tinctoriæ*) puncturing the twigs or young branches of the oak and depositing its ova. The irritation produced causes a flow of the natural juices of the plant to the part, which surround the ova and develop into a gall,

sometimes of considerable size. Within the gall thus formed the larva undergoes its various transformations until the winged insect bores a passage for itself from the centre to the surface and escapes. The best quality of galls are those collected before the fly has escaped. They are darker in colour and known in the bazárs as the "black" or "blue" variety, the "white" or perforated galls being lighter in colour.

Most of the above vernacular names signify "magic nuts," from the fact that galls have been much employed in India by magicians.

The principal chemical constituent of galls is *Tannin* or *Tannic Acid,* usually distinguished as *Gallo-tannic Acid,* to the extent of 50 to 60 or 70 per cent., and about 3 per cent. of *Gallic Acid.*

Medicinal uses.—Galls constitute a powerful vegetable astringent. The powder is used to some extent in India as an astringent in diarrhœa. A more general application is in the form of an ointment or suppository, usually combined with opium as a remedy for hæmorrhoids. Tannic and gallic acids are valuable styptics and astringents.

RANDIA DUMETORUM.

Vern.—*Beng.*—Menphal, Madan; *Hind.*—Mainphal, Manyul; *Sans.*—Madana; *Bom.*—Gelaphala; *Tam.*—Maruk-kallan-kai; *Tel.*—Mandá; *Pers.*—Júz-ul-kueh.

A small thorny tree of the *Rubiaceæ,* common in the jungles all over India, distributed from the Himálaya to Ceylon. The FRUIT when ripe looks like a small apple and has a sweetish, sickly smell. It is described by Sanskrit writers as the best and safest of emetics, and the drug on

which the ancient Hindús chiefly depended for causing emesis. The pulp of one ripe fresh fruit was usually sufficient for the purpose. It is still considered a reliable emetic and expectorant, useful in charitable dispensary work on account of its cheapness. The pulp may be removed, dried and powdered and kept ready for use, the dose being 15 to 60 grains as an emetic, and 5 to 10 grains as an expectorant.

The authors of the *Pharmacographia Indica* have shown the active principle of the fruit to be saponin, while valeric acid was also found to be present.

Medicinal uses.—In addition to the useful emetic property above indicated the fruit was advocated by Sir James Sawyer of Birmingham, in 1891, as a nervine calmative and antispasmodic,with properties resembling those of valerian. The drug had been brought to his notice by Mr. David Hooper. He recommended a tincture prepared with *Spiritus Etheris*, B. P., in doses of 15 to 30 minims in water.

RAPHANUS SATIVUS.

THE RADISH.

Vern.—*Beng.*—Múla; *Hind.*—Múli, Muro; *Sans.*—Múlaka; *Bom.*—Mula; *Tam.* and *Tel.*—Mullangi.

An annual herb belonging to the *Cruciferæ*, cultivated everywhere in the plains for culinary purposes.

The SEED and ROOT yield to distillation a fœtid essential OIL allied in its nature to that of mustard and other *Cruciferous* plants, and containing a certain proportion of organically combined sulphur.

Medicinal uses.—The seed and root are regarded as stimulant and diuretic.

RAUWOLFIA SERPENTINA.

Vern.—*Beng.*—Chandra ; *Hind.*—Chota-chand ; *Sans.*—Chundrika ; *Tel.*—Pátala gandhi.

A climbing shrub found in the tropical Himálaya and at moderate altitudes in Sikkim, Assam, Pegu and Tennasserim. Natural order *Apocynaceæ*. The Root is said to have been long known to the people of India as an antidote to poison and to the bites of poisonous reptiles and stings of insects. It seems to have some beneficial action as a febrifuge. In the *Pharmacographia Indica*, Prof. C. J. H. Warden indicated the presence of alkaloidal constituents and in a later research, conducted in conjunction with Assistant-Surgeon C. L. Bose (*Year Book of Pharmacy*, 1893, p. 128), has shown the root to contain an alkaloid allied in some respects to brucine and which was named provisionally, *Pseudobrucine*. Comparative physiological experiments with pseudobrucine and brucine showed the former to be weaker and slower in its action.

RHEUM EMODI.

Indian Rhubarb.

Vern.—*Beng.*—Banglá-révan-chini ; *Hind.*—Hindi-révand-chini, Chúkri ; *Bom.*—Ladaki-révanda-chini ; *Tam.* and *Tel.*—Náttu-iréval-chinni.

The Himálayan Rhubarb is usually considered to be the produce of *Rheum emodi* and the allied species *R. Moorcroftianum*, *R. Webbianum*, and *R. Spiciforme*, natural order *Polygonaceæ*, found wild in great abundance at altitudes of 11,000 to 12,000 feet on the Himálaya, in Kashmír and in Nepal, Sikkim and Bhutan. The rhubarb of commerce, known as Chinese or East Indian, is attributed to *R. officinale* and *R. palmatum*, growing in the

adjacent territory of South-Eastern Thibet and North-Western China.

The officinal part of the plants is the decorticated and dried ROOT or root-stock, known as "rhubarb," the Indian drug being of a darker colour, inferior aroma and coarser texture, and untrimmed, as contrasted with the commercial variety, while the powder is of a dull brownish-yellow colour instead of bright yellow.

The rhubarb of the Indian bazárs is for the most part an inferior grade of the Chinese drug, the better qualities sold by the Native druggists being English-grown and imported from London. The indigenous root is not used to any large extent in the country, although Dr. Watt reports having discovered on a recent visit to Kashmír and the Punjáb, that it is exported from the Kangra District alone to the extent of 1,000 maunds (4,000 cwts.) annually.

Rhubarb root of commerce contains a large proportion of *Chrysophanic Acid,* sometimes called *Chrysophan,* to which is due the yellow colour and probably some part of its cathartic property, although this has been attributed to *Cathartic Acid.* An allied substance, *Emodin,* has also been isolated, and a tannin, named *Rheo-tannic Acid,* besides resinous and mucilaginous principles. It usually contains a large proportion of crystals of oxalate of calcium.

Dr. O. Hesse has recently (1895) shown that rhubarb contains a series of substances related to each other in chemical composition, *viz.,* chrysophanic acid, emodin and *Rheïn,* and these substances probably originate from an unknown constituent by oxidation* [D. Hooper.]

Medicinal uses.—Stomachic and purgative, the latter action being followed by constipation, hence employed in simple diarrhœa. It has been little used in India as a pur-

* *Pharmaceutical Journal,* IV., 1321, 19th Oct. 1895.

gative. Dr. Watt has lately stated that he has found it used externally as an ingredient in certain preparations applied to wounds and in ophthalmia, uses which are probably applied in ignorance of the actual medicinal nature of the drug.

Substitute.—The root of a species of dock, *Rumex nepalensis*, very abundant in some parts of India, is sold under the name of '*Rewand chini*' in the bazárs of Bengal. It is used medicinally for rhubarb and contains similar constituents [D. H.]

RHINACANTHUS COMMUNIS.

Syn.—JUSTICIA NASUTA.

NAGAMULLI.

Vern.—*Beng.*—Jui-pana; *Hind.*—Pálak-juhi; *Sans.*—Yuthika-purni; *Bom.*—Gajkarni, Gachkaran; *Tam.*—Nága-malli; *Tel.*—Nágamalle.

A small shrub, belonging to the natural order *Acanthaceæ*, said to be indigenous to the Deccan and Ceylon, cultivated in many parts of Western and Southern India. The LEAVES and ROOT have long been regarded by the people of Southern India as antidotes to the bites of poisonous snakes; the name *naga-mulli*, by which the plant is most commonly known, indicating this property.

The active principle is a red resinous substance named *Rhinacanthin*: it is believed to be related to chrysophanic and frangulic acids.

Medicinal uses.—The root, powdered and made into a paste with lime juice, has been used with beneficial effect in eczema and ringworm, especially the variety of that affection known in India as *dhobie itch* (*Tinea circinata tropica*). The remedy was introduced to European practice

some years ago under the name of *Tong-pang-chong* and an alcoholic fluid extract tried in the treatment of cutaneous affections of a parasitic nature, with doubtful results.

RICINUS COMMUNIS.

THE CASTOR-OIL PLANT.

Vern.—*Beng.*—Bherendá; *Hind.*—Arand, Erand; *Sans.*—Eranda; *Tam.*—Amanakkam; *Tel.*—Eramudapu; *Bom.*—Erendi; *Assam.*—Eri.

The castor-oil plant, natural order *Euphorbiaceæ*, although common and apparently quite wild in the jungles in India, has afforded great botanists some scope for speculation as to whether it is really a native of India and not of Africa.

It has been cultivated in India from a remote antiquity. Two primary forms are known in this country:—(1),—a perennial bushy shrub, or small tree, grown usually as a hedge plant, with large fruits and large red seeds which may yield 40 per cent. of oil, used chiefly for lubricating and illumination; and (2),—a much smaller, annual plant, grown as a distinct crop or planted in rows in betel and sugar-cane and other gardens, with small grey seeds with brown spots, yielding 37 per cent. of oil, the better qualities of which are used for medicinal purposes. There are many local forms which serve to give a distinct character to the seeds of different districts, which are classed accordingly and named with the name of the district in which they are grown. The cultivation of the castor-oil plants extends throughout India, chiefly in the Madras, Bengal and Bombay Presidencies, and the transmission of the seeds to Calcutta and Bombay for export forms an important part of the coastwise and inland traffic.

The SEEDS contain a fixed OIL, castor-oil of commerce and pharmacy, *Oleum Ricini* of the Pharmacopœias, once known also as *Oleum Palmæ Christi*, in relation to the palmately shaped leaves. The oil is obtained chiefly by expression, and when "cold-drawn" or extracted without the aid of heat is colourless, or of a faintly yellowish or straw colour, practically odourless, with a bland and very slightly acrid taste. The following grades of castor-oil are known in the Calcutta bazár:—

1.—Cold-drawn.
2.—No. 1. Hot-drawn.
3.—Good second. Hot-drawn.
4.—Good second No. 2.
5.—Ordinary No. 2.
6.—Ordinary No. 3.

There are also intermediate qualities. The "cold-drawn" is not made at the present time in Calcutta, one firm which attempted to place it on the market having, it is said, become bankrupt. Nos. 2 and 3 are made from the small Madras seed by the owners of hand presses in Calcutta, of whom there are about 300, and by certain Native firms who own screw presses, worked by bullocks, and in the Bengal jails, where screw presses are employed. Hydraulic power is not used, as there is said to be a difficulty in regulating the exact amount of pressure for the different grades of oil required. Nos. 4, 5 and 6 in the above list are made from inferior seeds of the large variety grown in Bengal, and used and known as "lamp oil" and for lubricating.

For the medicinal oils the seeds are hand-cleaned and husked, the kernels dried in the sun and afterwards broken in a crushing machine. They are then placed in canvas bags and pressed between alternate iron-plates, the oil being collected in a vat beneath. In the hot-pressing process commonly in vogue a slow fire is placed beneath the hand-mill, which liquefies the oil and increases the yield. The oil is subsequently bleached by exposure to the sun and

partially clarified by boiling with water. This has the effect of coagulating the albumen, dissolving out mucilaginous matters and separating impurities. It is then filtered through a bed of animal charcoal and six or eight folds of flannel cloth and is ready for use.

The inferior qualities are made by a similar process, less care being taken in the extraction and purification. many parts of India an inferior oil is produced by boiling the crushed seeds in water, the oil being collected as it rises to the surface.

An improved process* of manufacture of medicinal castor-oil has been perfected in Calcutta, and in London, where great quantities of Indian seed are expressed annually. It consists essentially of subjecting the carefully cleaned seeds, whole and unhusked, in a specially designed hydraulic press, to a pressure of 480 tons, without the aid of heat, the oil being drawn at once into a series of filters through which it passes *in vacuo* to the bottles in which it is ultimately placed upon the market. The advantages of this process are that while the oil is absolutely "cold-drawn," thus avoiding much of the acridity and nauseousness commonly associated with it, it is less complicated and more economical than the process ordinarily employed. Only half of the available 44 per cent. of oil is extracted by the first pressure; the marc is subsequently subjected to a second, giving an additional 16 per cent., which is employed as a lubricant.

The chemistry of castor-oil is scarcely complete. It has been the subject of many investigations, but the identity of the active principle has not yet been satisfactorily settled. The oil consists chiefly of *Ricinoleate of Glyceryl*, or

* Mitchell's Process. *Pharmaceutical Journal, Chemist and Druggist,* and *British and Colonial Druggist*, May 11, 1895.

Tri-ricinoleine, soluble in all proportions, unlike most fixed oils, in absolute alcohol and glacial acetic acid. The seeds have also been stated to contain an alkaloid, *Ricinine*, which has no purgative property. *Ricinoleic Acid* has been believed to be the purgative principle, and it has been isolated and employed as such,* while it has been contended that the action is due, not to an intestinal irritant ready formed in the oil, but to ricinoleic acid which is set free by the partial saponification of the oil by the alkalis of the small intestine. The poisonous constituent of the seed has been isolated and named *Ricin*.† It is believed to be an albuminoid body, identical with the "β phytalbumose," separated from the dried juice of *Carica Papaya* and belonging to the class of unformed ferments. It is a most powerful poison, exercising a remarkable power of coagulation on the blood. It does not act as a purgative but produces hæmorrhagic inflammation of the gastro-intestinal tract, even when administered hypodermically. Subsequent experiments have shown this substance to be identical with similar ferments contained in other drastic seeds of *Euphorbiaceous* plants, including *Croton Tiglium* and *Jatropha Curcas*, q. v. To the presence of this body is therefore attributed the fact that three of the seeds have been known to be poisonous to an adult, while the castor-oil cake after expression of the oil has been fatal to cattle when given as a food.‡

* Prof. Hans Mayer: *Pharmaceutical Journal*, January 31, 1891, p. 661.

† Her Stillmark. Pharmacological Institute, Dorpat: *Pharmaceutical Journal*, November 2, 1889, p. 344.

‡ A valuable *Report on the Castor Oils in the Indian Section of the Imperial Institute, London*, by Deering and Redwood, has been published as Part 17 (1894) of the Agricultural Ledger, obtainable at the Imperial Institute and at the Indian Museum, Calcutta.

Commercially the seeds and oil are products of great importance. The amount of castor-oil seed exported from India, chiefly from Calcutta, during the year ending March 1895* amounted to 1,174,895 cwts. (1,644,850 maunds) valued at Rs. 55,07,182 (about £280,000), and of castor-oil to 2,679,236 gallons, valued at Rs. 25,66,253 (about £130,000) about one-half of the export going to the United Kingdom.

An important economic use of the plant is that of rearing the *eri* silk-worm, which feeds on the leaves, and which Mr. T. N. Mukharji, F.L.S., has done much of late years to popularize.

Medicinal uses.—The use of pure, medicinal castor OIL as a mild, reliable, non-irritant, and safe purgative is universal. It is official in all the Pharmacopœias of the world. The finer qualities are now popularly termed "tasteless." It is specially useful (plain or in emulsion with mucilage) in inflammatory conditions of the bowels, in diarrhœa of childhood, and often combined with opium in simple diarrhœa. The purgative effect should be obtained with doses of one to two drachms taken on an empty stomach. Larger doses frequently induce diarrhœa. A compound of the oil with magnesia, called Magnesium Ricinoleate, has been suggested† as probably presenting the active principles in an elegant form, but its therapeutic action proved disappointing. The corresponding Soda Ricinoleate was also suggested as a useful form for suppositories.

The oil is largely used in India as a basis of perfumed toilet oils for anointing the head. The ROOT-BARK and LEAVES have purgative properties and have been used in

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* Trade and Navigation Report of British India, 1895.

† Ralph Stockman, M.D., and D. B. Dott, F.R.S.E., in *Pharmaceutical Journal*, February 23, 1895, p. 706.

India. The leaves applied to the breasts of women, and a fluid extract given internally, act as a galactagogue.

Adulteration.—Inferior qualities of seeds are often mixed with superior and the oil is adulterated in Calcutta with *Mahua* and other oils that may be found cheaper at the time, but adulteration is practised on a limited scale.

ROSA DAMASCENA.

THE DAMASK OR PERSIAN ROSE.

Vern.—*Beng.*— Goláp-phul; *Hind.*— Guláb-ke-phul; *Sans.*— Satapattri (hundred-leafed); *Bom.*— Gulab-nu-phul; *Tam.*— Guláppa, Irojáppu; *Tel.*—Roja-puvou, Gula-puvou; *Pers.*— Guli-surkh.

Several species and cultivated forms of roses (natural order *Rosaceæ*), are grown in India. The shrubby plant, with the familiar red, double flowers, *R. damascena*, is the most important: it is cultivated on large areas of ground set apart as rose gardens in several places in Bengal and the Punjáb, chiefly near Patna, Ghazipur and Lahore, and the rose-leaves, or more correctly, petals of the flowers, are sold to distillers for the production of rose-water and *attar* of roses. *R. centifolia* is also cultivated, and several less important species occur wild, the latter including *R. bengalensis*, which has an odour suggestive of jargonelle pear.

Rose-water (*guláb*) is distilled in simple Native stills, a *lakh* (1,00,000) of roses being reckoned to produce 100 bottles of rose-water, each containing about 20 ounces. The newly distilled water is set aside over-night and the slight 'scum' of *attar* which floats on the top is carefully removed with a feather and placed in the sun to clear. This is best effected in the cold weather, when the yield is greatest. The average yield of good *attar* from a lakh of roses has been estimated at one *tola* weight or 180 grains

The calyces of the flowers are not removed before distilling, as they do not affect the odour and perhaps slightly increase the yield.

The essential OIL (rose-oil) or OTTO, or *attar* of roses, to which the flowers owe their fragrance, and which is so important an article of perfumery, is greatly esteemed in India, practically all that is produced in the country being consumed, while it is also imported in considerable quantities from Persia and also from Turkey and, in the ordinary course of European trade, from London. It is freely used as a perfume by the wealthier classes of the people: its distribution along with *pan-supári* is the common expression of good feeling towards guests, and it is an essential accompaniment of festive occasions, *durbars* and *pûjas*. Rose-water is equally popular and similarly used: it is also imported, as are dry roses for distillation.

Rose-oil may vary in colour from emerald green to reddish yellow: the specific gravity ought to be ·87 to ·89, and it may solidify at 11° to 18° C. according to the amount of stearoptene it contains, which is very variable according to the circumstances of growth and frequently of adulteration.

This stearoptene or solid hydrocarbon constituent differs from other bodies of the same class in other essential oils (*e.g.*, thymol from the oil of *Carum copticum*) in being odourless. Flückiger believed it to belong to the paraffin series. The remaining liquid constituent or elæoptene constitutes the odorous portion of rose-oil.

An abstract of the newer chemistry of otto of roses will be found in the *Year Book of Pharmacy*, 1894, page 74, where it is stated that the chief constituent of the elæoptene is an alcohol which has been named *Roseol*.

Medicinal uses.—A conserve known as *gulkand* is made in India from the fresh rose petals. It has mild laxative

properties: the unexpanded flower buds are considered astringent. Rose-water is much used as a vehicle for medicines. The otto is seldom used medicinally except for perfuming emollients and medicinal soaps.

Adulteration.—Rose-oil, as retailed by the *attar-wallahs* (otto-sellers) all over India, is much adulterated with sandal-wood and other oils. Sandal-wood chips are also added to the rose leaves before distilling. The essential oil of *Andropogon Schœnanthus* (geranium grass oil) is exported from India to Turkey for the express purpose of adulterating otto of roses, but it does not appear to be used for this purpose in India.

RUBIA CORDIFOLIA.

THE INDIAN MADDER.

Vern.—Manjít, Manjishtha.

A climbing plant of the *Rubiaceæ*, growing in the North-West Himálaya and the hilly districts of India generally. The ROOTS are collected and used in India for a red dye which they yield. The chemical constituents are a red principle, *Purpurin*, and a yellow colouring matter, named *Munjistin*.

Medicinal uses.—*Manjít* was formerly used to some extent in medicine and was believed to have deobstruent properties. It is chiefly used as a colouring ingredient of medicinal oils.

RUTA GRAVEOLENS.

GARDEN RUE.

Vern.—*Beng.*—Ispand; *Hind.*—Sadáb; *Sans.*— Sadápaha; *Tam.*—Arvada; *Tel.*—Sadápa.

This plant is cultivated in Indian gardens. It belongs to the natural order *Rutaceæ*. An essential OIL distilled

from the HERB is used in medicine as a stimulant to the uterine and nervous systems, given in hysteria and amenorrhœa.

SACCHARUM OFFICINARUM.

THE SUGAR-CANE.

Vern.—*Beng.*—Ak ; *Hind.*—Ukh, Ganna ; *Sans.*—Ikshu ; *Bom.*—Ús, Sheradi ; *Tam.*—Karúmbú ; *Tel.*—Cheruku.

The *Saccharum* genus belongs to the grass order (*Gramineæ*). The common sugar-cane is very extensively cultivated throughout India in several varieties or races. It is considered doubtful by botanists whether it is a native of India, although there is much evidence that is believed to indicate that it may have been. It has been cultivated in this country for many centuries, during which time it has been held in great veneration by the Hindús and used by them as votive offerings at the shrines of their gods.

Besides the varieties of *S. officinarum* which are cultivated for the sugar which they yield, several varieties of *Saccharum* are grown as fibre producers. In the hot weather the thin, tender portion of the stem is cut into small pieces and very largely consumed raw throughout the country as a sweetmeat, being simply chewed. The expressed juice is also much used as a sweet drink.

The chief constituent of the sugar-cane is

SUGAR,

which is contained in the expressed juice, from the hollow jointed stem of the mature plant. The chemical compound, known as cane-sugar is a most interesting product of the chemistry of Nature. It is a derivative of starch, a carbohydrate, and is believed to be produced by the action of the sun's rays in the leaves of certain plants and stored up, in

aqueous solution, in the tissues as reserves in the plant economy. It occurs in several members of the vegetable kingdom besides the sugar-cane, the most important commercially being the root of *Beta maritima*, the beet, which is grown in India as a culinary vegetable, in the juice of certain palms, chiefly *Cocos nucifera*, *Borassus flabelliformis* and especially the date-palm, *Phœnix sylvestris*.

In the process of manufacture of Indian sugars the sweet juice or *jaggery*, also known as *ras*, is strained and boiled down to a dark-brown thick consistence in which form it constitutes *gúr* or *gul*, the crude form of sugar commonly used by the people of India. It contains a considerable proportion of "molasses" or "treacle" known as *chhoa*, the uncrystallizable portion, *invert* sugar, of the saccharine juice, which is drained off and sold as a distinct product. Indian molasses does not quite correspond to that produced in European sugar refining: it has a deep black colour and pronounced bitter taste of "caramel" or "burnt sugar," due to over-boiling, and is of thinner consistence and usually fermented. When the better qualities of *gúr* have been more or less completely drained of molasses they constitute the coarse brown sugar, known as "country" sugar, *shakkar* or *bangla chíní*,* which is much used, and which consists of a soft, moist, partly crystalline mass varying much in quality. A coarser description of *gúr* called *rab* is sold to the refiners, and from this the crystalline forms of sugar are directly prepared. The molasses having been pressed out, the crystalline portion is bleached in the sun, dissolved, clarified, and crystallized, the resulting product being the familiar white sugar, *chíní* or *saféd shakkar*

* The term is believed to indicate that the process of sugar-refining may have been learned from China at an early period of the Indian sugar industry.

This is now very successfully manufactured at several sugar mills in Bengal and Madras, those of the Cossipore Sugar Works, near Calcutta, and the Rosa Factory near Shahjahanpur, being the most important. Double refined and re-crystallized sugar, *misrí* or *khand*,* is also produced in several forms, including *kuza misrí*, sugar-candy, which is made by pouring the clarified solution or syrup into vessels in which strings are suspended round which the crystals congregate.

The export trade in Indian sugar has declined from the very important position to which it attained in the time of the Honourable the East India Company, due in large measure to the advent of beet-sugar and its extensive manufacture in Europe, but crudely refined or unrefined sugar is exported annually from Madras, Bombay and Calcutta to the extent of about a million hundred-weights and of refined sugar about a fourth of this quantity. The imports of refined sugar show a decline during recent years, due to improvements in local manufacture, but the amount imported during the year 1894-95 was 2,296,193 cwts., valued at Rs. 283,59,600 of which quantity more than one-tenth part consisted of German beet-sugar.

Medicinal uses.—Sugar has practically no direct therapeutical effects. It is a sweet demulcent, and may be regarded as nutritious and pectoral. It is a valuable agent in pharmacy, and is much used in the preparation of syrups and confections, for disguising the taste of unpleasant medicines, as a preservative and for protecting ferruginous preparations from oxidation. Treacle is employed as a pill excipient and caramel as a colouring agent.

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* It is interesting to note that the Sanskrit word *khanda* (candied sugar) is the origin of the familiar term "candy" or "sugar-candy" as applied to crystalline forms of the commercial product.

SALIX CAPREA.

THE SALLOW.

Vern.—*Ind.*—(The Flowers) Bed-mushk.

This is a species of willow, natural order *Salicineæ*, cultivated in Persia, and in North-Western India, in Kashmír, and at Peshawar and Lahore.

From the fragrant FLOWERS are distilled an essential OIL or *attar* and a perfumed water (*ma-el-khiláf*) which is much used in Northern India, chiefly by Persians, and in Western India by Parsís, and regarded as stimulant and aromatic. The BARK contains the crystalline glucoside, *Salicin*, and tannin. Salicin is contained in the bark of several species of willow grown in India: it is not, however, extracted.

The leaves of this and several other Indian willows are occasionally covered with a syrupy exudation, which dries up in thin, white flakes to a sugar or manna. Mr. J. G. Prebble has described* such an exudation which he found on the leaves of a tree of *S. tetrasperma*, growing at Mahableshwar in the Western Ghats. It was very soluble in water and seemed to correspond in chemical composition to a Persian manna described as Bidangubin or "willow-honey" which contains 12 per cent. of a peculiar sugar which has been named *Bidenguebinose*.†

Medicinal uses.—The BARK of *S. Caprea* is said to be used as a febrifuge in the localities where it grows. Salicin was formerly much used as an antiperiodic, but it has been found to possess little, if any, such property. It is now used as a tonic and anti-rheumatic, and was used some years ago with beneficial effect in influenza.

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* *Pharmaceutical Journal*, July 8th, 1893, p. 21.

† *Pharmacographia Indica*, Vol. III, p. 368.

SALVADORA PERSICA.

THE TOOTH BRUSH TREE.

Vern.—*Beng.* and *Hind.*—Pílu, Chhota-pílu, Jhal; *Sans.*—Pilu; *Bom.*—Pilvu, Piludi, Kakhan; *Tam.*—Ughai-puttai, Karkol; *Tel.*—Vara-gogú; *Pers.*—Darakht-i-miswak.

A small tree or shrub, which, with the allied *S. oleoides*, natural order *Salvadoraceæ*, is found in the arid tracts of Sind, in the Punjáb, and in North-Western India and Persia. The Persian name given above signifies "tooth-brush tree," from the fact that pieces of the root are used as tooth-brushes by the people in the regions where the plant grows.

The fresh ROOT-BARK, bruised and applied to the skin, is said to act as a vesicant: in actual experience it has been found to cause redness without vesicating, and may be regarded as an active external stimulant.

The root-bark of *S. persica* afforded Warden (*Pharmacographia Indica*) a quantity of *trimethylamine* which was believed to partly exist in the free state and partly as chloride, and to which the stimulating effects of the fresh bark when applied to the skin were believed to be due. A trace of an alkaloid was also separated, for which the name *Salvadorine* was proposed.

From the SEEDS, an OIL of thick consistence, bright green colour and pungent odour is expressed, which is used as a stimulant application in rheumatism. The LEAVES are used as a poultice with like effect in similar affections.

SALVIA SPINOSA.

Dymock, in the *Pharmacographia Indica*, describes under *Phyllanthus madraspatensis*, natural order *Euphorbiaceæ*, a Persian drug, known as *Kanocha* seed in the bazárs

of Western India, a small triangular seed which, when soaked in water, immediately becomes thickly coated with a semi-opaque mucilage. The seeds are oily and have a sweet nutty taste, and are said to be used medicinally on account of the mucilage which they afford. O. Stapf (*Pharm. Journ.* [3], XXIII, p. 745) announces that he has found these seeds to be the nutlets of *Salvia spinosa* (natural order *Labiatæ*), which are sold under the name of *Marv*, and believed to be used as above.

The seeds of *S. plebeia* and *S. ægyptiaca* are used in the North of India for gonorrhœa and as aphrodisiacs.

SAMADERA INDICA.

Vern.—*Tam.* and *S. Ind.*—Niepa, Samadara.

A tree, belonging to the natural order *Simarubeæ*, found in Western India and extending to Malabar and Ceylon. The BARK and WOOD contain a bitter principle, *Samaderin*, also called *Quassiin* by Flückiger. The wood has properties resembling those of quassia, and was considered by Dymock an efficient substitute for it. The SEEDS contain a similar principle, together with a quantity of fixed oil.

Medicinal uses.—The wood may be regarded as a bitter tonic resembling that of quassia.

SANTALUM ALBUM.

THE SANDAL-WOOD TREE.

Vern.—*Beng.*—Chanand, Swet-chandan, Pitchandan; *Hind.*—Chandal, Sandal; *Sans.*—Chandana; *Bom.*—Safed-chandan; *Tam.*—Sandanak-kattai; *Tel.*—Gandhapu-chekka.

A small, somewhat delicate evergreen tree, natural order *Santalaceæ*, indigenous to, and cultivated in, the Mysore State, grown also in Coimbatore and the Southern parts of

Madras, adjoining Mysore. The cultivation and felling of the trees is entirely under Government monopoly in Mysore, and produces a considerable portion of the forest revenue. There is no actual monopoly in the Madras Presidency, but the greater portion of the trees is "reserved" and under the administration of the Forest Department.

The tree is valuable for its aromatic, yellowish-brown heart-WOOD, which contains an essential OIL—Sandal-wood oil. The wood reaches maturity at about the age of thirty years, when the tree is felled, now more generally uprooted, the bark removed, and the white outer sapwood and branches, which are odourless and useless, rejected. The wood is then roughly shaped into billets—the sandal-wood of commerce—sorted into various grades and sold by auction, being exported chiefly to Bombay, whence it is distributed to the drug markets of the world. The export from India, for the year ending March 1895, amounted to £56,736.

The essential oil is distilled from small chips or raspings of the heart-wood, which usually yields in India about 2½ per cent., although as much as 5 per cent. is said to have been obtained with more efficient appliances. The ROOTS are considered to yield a larger quantity and a finer quality of oil and usually fetch a good price at the auctions.

The oil has a persistent, somewhat roseate odour and aromatic, bitterish, slightly acrid taste. It consists almost entirely of two bodies—an alcohol, named *Santalol* (80 to 90 per cent.), and a small quantity of a corresponding aldehyde.

The oil is distilled in Mysore and exported, but it is not of high quality, dark-coloured and usually much adulterated before it reaches the markets. The bulk of the oil of English commerce is distilled in London or in France and Germany and the quality varies very considerably.

The fragrant wood has been used in India from a very early period. It occupies an important place in Hindú ceremonials: the last mark of respect usually paid to a departed chief is to afford him a funeral pyre entirely composed of sandal-wood. It is much used by the Parsís in their fire temples. The powder rubbed into a paste is used by the Brahmins for their sectarial markings on the forehead.

Carved work in sandal-wood employs quite an industry in Southern India and Ceylon; fancy boxes are made of the wood which retain the odour of the oil for many years. The oil forms the basis of many of the perfumed ottos so popular in India. A fixed oil is obtained by expression from the seeds, which is used in Mysore for burning in lamps.

Medicinal uses.—Sandal-wood has long been regarded in India as bitter, cooling, astringent and useful in bilious fevers: applied externally in the form of a paste with water in prickly heat and skin eruptions. The essential Oil is largely used as a popular remedy as a demulcent, diuretic and mild stimulant in gonorrhœa and kindred affections and in chronic cystitis, given in doses of 10 to 30 minims, commonly in capsules or emulsion. A fluid extract of the wood is given in America in similar cases with good effect.

Adulterations.—Castor-oil is a common adulterant of Indian sandal-wood oil. In the oils of commerce cedar-wood and copaiba oils are very frequently found, as much as 10 per cent., and are exceedingly difficult of detection. A method of detecting the admixture of at least 2 per cent. of the former was communicated to the British Pharmaceutical Conference, 1895, by Mr. E. J. Parry, B. Sc.

SAPINDUS TRIFOLIATUS

Syn.—S. EMARGINATUS.

THE SOAP-NUT TREE.

Vern.—*Beng.*—Ritha, Bara-ritha ; *Hind.*—Ritha ; *Sans.*—Phenila ; *Bom.*—Ritha, Aritha ; *Tam.*—Ponán-kottai ; *Tel.*—Kunkudu-káyalu.

A large tree common in Southern India, cultivated in Bengal. The FRUIT, and that of *S. Mukorossi* (Syn.—*S. detergens*) the soap-nut tree of Northern India (Hind.—*Ritha, Dodan*) are the soap-nuts which are used so largely in India by the people as soap-substitutes for washing. Both trees belong to the natural order *Sapindaceæ*. The fruits contain *Saponin*, estimated in those of *S. trifoliatus*, by the authors of the *Pharmacographia Indica* at 11·5 per cent.

Medicinal uses.—Soap-nuts have long been used in India in domestic medicine. They may be employed as emetic; in doses of 1 to 2 drachms (purgative in larger doses), nauseant, and as expectorant, in doses of 10 to 20 grains of the pericarp, or pulp and kernel of the fruit.

SARACA INDICA.

Syn.—JONESIA ASOKA.

THE ASOKE TREE.

Vern.—*Beng.* and *Hind.*—Asok ; *Sans.*—Asoka, Kankéli ; *Bom.*—Ashoka, Jásúndi ; *Tam.*—Ashogam ; *Tel.*—Asek.

The *asok* is one of the sacred trees of the Hindús. It is cultivated throughout India, forming a very attractive object in gardens with its dense clusters of brilliant orange or yellow-coloured flowers. It belongs to the natural order

Leguminosæ. The bark is used in Native medicine: it contains a quantity of tannin.

Medicinal use.—The bark is an astringent: it is much used by Indian practitioners in uterine affections, especially in menorrhagia.

SAUSSUREA LAPPA.

Syn.—Aplotaxis Lappa : Aucklandia Costus.

The Costus.

Vern.—*Beng.*—Páchak ; *Hind.*—Kút, Kust, Pachak ; *Sans.*—Kushtha ; *Bom.*—Ouplate, Upalét ; *Tam.*—Goshtan ; *Tel.*—Kustam.

The Costus of the Greeks and Romans was a medicine held in high repute from the remotest antiquity. Its origin was for long shrouded in obscurity, but the drug now known and easily obtainable in the bazárs under the same name, and believed by some to be identical, is now referred to *Saussurea Lappa* and probably also *S. hypoleuca* (Syn.—*Aplotaxis auriculata*), stout herbs belonging to the natural order *Compositæ*, and growing abundantly in the mountains of Kashmír. It was formerly erroneously referred to *Costus speciosus* (q. v.), a plant of the natural order *Scitamineæ*, common in the jungles in Bengal, the roots of which are named by the same vernacular names, although quite destitute of odour, that of the true *kust* suggesting the perfume of orris or violets.

The Roots are dug up in large quantities in Kashmír where its collection is a State monopoly, and, as Dr. Watt has lately discovered, in Kulu and Kangra ; it is cut into small pieces of two or four inches long and sent down to Calcutta and Bombay, whence it is exported very

largely to China, where it is used as an incense and as a medicine.

The Costus root, when dry, is brown-coloured, brittle and resinous: it has a bitter pungent and camphoraceous taste and faint fragrant odour of orris and violets, as indicated above, or of musk and orris root. It contains *Inulin*, a form of starch peculiar to the roots of the *Compositæ*, and resinous principles to which the odour is due. It somewhat resembles elecampane in appearance, structure and chemical composition. It is used as a perfume.

Medicinal uses.—The drug has been used in India from the earliest times as a tonic and aphrodisiac. It may be regarded as an aromatic stimulant. It is used in India as an ingredient in stimulating mixtures for cholera and in an ointment applied to ulcers.

Adulteration.—*Kust* is said to be sometimes adulterated before it reaches India, with a root known as *tut*, referred to a species of *Salvia*.

SCHLEICHERA TRIJUGA.

Vern.—*Hind.*—Kosum, Kosumba; *Bom.*—Kosamb; *Tam.*—Pu-maram; *Tel.*—Púskú, Roatanga.

A large tree, of the natural order *Sapindaceæ*, growing in the lower Himálaya towards the North-West, and also in Central and Southern India, Burma and Ceylon. A fine quality of lac is produced on the young branches. The seeds contained in the pulpy fruit yield to expression a fixed OIL which is said to be the original "Macassar Oil." A recent chemical examination of the oil under this name appears in the *Year Book of Pharmacy* for 1894, p. 179.

This oil has been much recommended as a stimulating and cleansing application to the scalp, promoting the growth of the hair.

SCILLA INDICA.

Syn.—LEDEBOURIA HYACINTHINA.

Vern.—*Beng.* and *Hind.*—Suphaidi-khus; *Bom.*—Bhuíkándá: *Tam.*—Shiru-nari-vengayam.

A *Liliaceous* plant very common in sandy soil in the Konkan. The squill of the Indian bazárs is believed to partly consist of the BULBS of this plant (*S. indica*, Baker) and chiefly of *Urginea indica* (the *S. indica* of Roxburgh) q. v. Both have been found to be efficient substitutes for the official squill (the sliced and dried bulbs of *Urginea Scilla*). As found in the bazárs, the drug is usually in the whole or unsliced state. The two kinds of squill may be distinguished by the *Urginea* bulb being imbricated and the *Scilla* bulb being tunicated.

Medicinal uses.—Squill is much used in medicine as a stimulant, expectorant and diuretic.

SCINDAPSUS OFFICINALIS.

Vern.—*Beng.*—Gaj-pipul; *Hind.*—Gaj-piplí, Barí-piplí; *Sans.*—Kari-pippalí; *Bom.*—Thora-pimpali; *Tam.*—Atti-tippili; *Tel.*—Enuga-pippalu.

A large climbing plant growing in tropical parts of India, common in the Midnapur district, where the sliced and dried FRUIT is sold in the bazárs as a carminative and stimulant medicine. It is chiefly used as an aromatic adjunct to other medicines.

SEMECARPUS ANACARDIUM.

THE MARKING-NUT TREE.

Vern.—*Beng.* and *Hind.*—Bhéla, Bhiláwá; *Sans.*—Bhallátaká; *Bom.*—Bibba; *Tam.*—Shén-kottai; *Tel.*—Jidi-vittulu.

A moderate-sized tree, belonging to the natural order *Anacardiaceæ*, growing on the temperate Himálaya and in the hotter parts of India: common in Eastern Bengal, but not extending further South.

The pericarp or fleshy pulp of the fruit or SEED abounds in a black, oily, acrid juice which is universally utilized by the people of India as "marking ink" for cotton fabrics, hence the popular name applied to the tree. It is used in combination with lime water or caustic lime, which act as mordants, and it is practically indelible, being insoluble in water, although soluble in alcohol after treatment with strong alkali. The juice acts as a powerful escharotic when applied to the skin: it is little used medicinally. A dark brown OIL is extracted, to the extent of 32 per cent. (Dymock), by boiling the bruised seeds in water, which retains the acrid properties of the crude juice, and is closely allied to the vesicating oil of the Cashew-nut (*Anacardium occidentale*) q. v. and that of the *Holigarna*, q. v., the active principles being doubtless the same—anacardic acid and cardol.

The kernels yield to expression a sweet OIL which has no vesicant properties. The root-bark contains similar vesicating principles.

Medicinal uses.—The juice of the nut is sometimes used in small quantities as a counter-irritant in rheumatism and sprains. If not used with caution it causes erysipelatous imflammation and swelling. Its irritant properties are sometimes employed to simulate marks of bruises by persons feigning disablement.

It is occasionally used internally in small doses (1 to 2 minims) diluted with a bland oil in scrofulous affections and syphilis. The vesicant oil is similarly employed to a small extent. Both are used in horse medicines.

SESAMUM INDICUM.

Sesamé or Gingeli Oil : Tíl : Benné Oil.

Vern.—*Beng.*—Tíl ; *Hind.*—Tíl, Gingli ; *San.*—Tila ; *Bom.*—Tal ; *Tam.*—Ellu ; *Tel.*—Nuvvulu.

An annual herb or small bush, 2 to 4 feet in height, belonging to the natural order *Pedalineæ*, indigenous to India and very extensively cultivated, especially in the warmer regions, for its oil-yielding seed. Several varieties are known in commerce—black, white and red—according to the colour of the seed, the first giving the largest yield and the best quality of oil.

The minute flat seeds yield to expression about 30 to 40 per cent. of a clear, limpid, non-drying Oil, of a pale straw to dark amber colour and, in the finer qualities, with practically no odour and bland taste, not readily becoming thick or rancid. It consists chiefly of oleine, which constitutes the liquid portion to the extent of about 75 per cent., the solid portion being palmitic, stearic and myristic acids.

Sesamé seed and oil form an important article of export from Calcutta and Madras, Bombay and Karachi, the amount of seed exported, chiefly to France and Italy, from the whole of British India in 1894-95 being 2,324,793 cwts. (32,55,000 maunds) valued at Rs. 1,88,08,353 (about £945,000). Dr. Watt estimates* that the total area of land under sesamé in India must be about 10,000,000 acres,

* *Dictionary of the Economic Products of India.*

probably much more, and that the local consumption is, on an average, two-thirds of the actual outturn.

Sesamé oil has been used from time immemorial for dietetic purposes throughout India, and the seeds enter largely into the composition of Native confectionery.

The oil forms the basis of the majority of the perfumed and medicinal oils so popular with all classes of the people: the odours of fragrant flowers—jasmine and the like—are extracted by means of the seeds, placed in alternate layers with those of the flowers and, after a few days, the scented oil expressed.

Tíl oil is also much used as an emollient and as an illuminant.

Medicinal uses.—The SEEDS are emollient, demulcent and laxative, hence used with good effect as a decoction, taken internally for piles, and in sweetmeats against constipation. The OIL may be employed in pharmacy for all the purposes to which olive oil is applied. The LEAVES are used in America as a demulcent. They are mucilaginous when placed in water: an emollient poultice is also made from them.

Adulteration.—Sesamé oil is probably a very common adulterant of the olive and almond oils of commerce. It is itself adulterated in India with ground nut and mustard oils.

SESBANIA ÆGYPTIACA.

Syn.—ÆSCHYNOMENE SESBAN.

Vern.—*Beng.*—Jayanti; *Hind.*—Jayantí, Jet, Rasín; *Sans.*—Jyantika; *Bom.*—Janjan, Shevári; *Tam.*—Champai; *Tel.*—Somanti.

A small tree, of the natural order *Leguminosæ*, found wild and cultivated in almost all parts of India.

Medicinal uses.—The LEAVES are much used in the form of poultices to promote suppuration of boils and abscesses and absorption of hydrocele and inflammatory swellings. The SEEDS are supposed to have stimulant, emmenagogue properties.

SESBANIA GRANDIFLORA.

Vern.—*Beng.*—Bak; *Hind.*—Bak, Agasta; *Sans.*—Baka, Vaka; *Bom.*—Agasta; *Tam.*—Agati; *Tel.*—Avesi.

A tree, also belonging to the *Leguminosæ*, cultivated in Bengal for its flowers which are given as an offering to the gods. It is also largely cultivated in South India to afford shade to the betel vine, as also for its leaves, which are used as a pot-herb. The flowers and the young pods are eaten cooked.

Medicinal use.—The fresh BARK is astringent and contains a red gum resembling Bengal kino: an infusion of it is given in small-pox and other eruptive fevers.

SHOREA ROBUSTA.

THE SAL TREE.

Vern.—*Beng.*—Sál, Shal; *Hind.*—Sál, Sala. (The Resin) Rál, Dhúná; *Sans.*—Sala; *Bom.*—Sal; *Tam.*—Kungiliyam; *Tel.*—Guggilamu.

A large timber tree, of the natural order *Dipterocarpeæ*, common in the Sub-Himálayan regions and the forests of Western Bengal. Large quantities of a brown, tasteless and odourless RESIN exude from incisions made in the bark, known as the Dammar resin of the Indian bazárs. It is used for several of the purposes to which ordinary pine resin is put, as an astringent and as an ingredient of stimulating plasters and ointments. It is also used as

incense and for fumigating apartments. The BARK contains tannic principles and yields, on boiling with water, an extract similar to catechu, which is used to a small extent medicinally as an astringent.

SHUKAI.

Vern.—*Ind.*—Shukai.

This is a Persian drug which is sold in all the Indian bazárs. It was described by Dymock and Warden in the *Pharmaceutical Journal*, January 9, 1892, and ascribed to *Noea spinosissima* (natural order *Chenopodiaceæ*), but doubtfully: the popular name is therefore adopted at the head of this article. The drug as met with in India consists of all parts of the plant, including the roots, broken up, the greenish-yellow, crooked, channelled, branched stems and leaves with petioles clasping the stem being the most prominent portions.

An exhaustive chemical examination showed the presence of an alkaloid, a glucoside, a characteristic acid principle and two distinct resins, besides other less important constituents.

Medicinal uses.—Shukai is said to be held in great repute in Persia as a remedy for ague, and it has been regarded as useful in palsy, melancholia and leprosy.

SIDA CORDIFOLIA.

Vern.—*Beng.* and *Hind.*—Balá, Berelá, Bariara; *Sans.*—Balá; *Bom.*—Chikana; *Tam.*—Mayir-manikham; *Tel.*—Chitimuttí.

The ROOTS of this and several other species of the genus *Sida* (*S. carpinifolia, S. rhombifolia, S. spinosa*), natural order *Malvaceæ*, weeds common in most places all over India, are used in infusion as cooling, astringent and tonic medicine, and occasionally given in nervous disorders.

SIEGESBECKIA ORIENTALIS.

Vern.—*S. Ind.*—Katampam.

A *Composite* plant common throughout India. It has long been known in China, where it is called *kau-kau*, as a remedy for ague, rheumatism and renal colic: its medicinal properties are not known to the Natives of India (Dymock). It contains a bitter crystalline principle which has been named *Darutine*, which is believed to be a derivative of salicylic acid, and which does not appear to be an alkaloid, glucoside, acid or resin.

Medicinal uses.—A tincture of the drug has been recommended, in doses of 1 to 2 drachms, as a remedy in scrofulous and syphilitic affections: externally a mixture of equal parts of the tincture and glycerine has been tried in Europe with good effect in ringworm and similar parasitic eruptions. Antiseptic properties have been ascribed to the fresh plant, applied to unhealthy sores.

SINAPIS sp.

See BRASSICA.

SMILAX CHINA.

CHINA ROOT.

Vern.—*Beng.* and *Hind.*—Chob-chiní, Shúk-chiná; *Sans.*—Chobachini; *Bom.*—Chob-chíní; *Tam.*—Paringay; *Tel.*—Pirangi-chekka.

A shrub indigenous to China and Japan, where it is called *Too-fuh*, not found in India, although the drug, China Root, is common in all the bazárs. It is believed, however, that the roots of *S. glabra* growing in Assam, Sylhet and the Khásia Hills probably constitute part of the drug as sold in India. The natural order is *Smilaceæ*. The drug

consists of the dried tuberous Roots, usually peeled by the Native drug-sellers; it has long held the reputation of possessing properties allied to those of sarsaparilla, which is the root of several species of *Smilax* indigenous to tropical America. A glucosidal principle has been isolated from this root corresponding to that reputed to be the active constituent of sarsaparilla.

The drug is imported from China to a considerable extent by coasting steamers trading with Calcutta and Bombay. It is now completely neglected in European medicine, although once held in considerable esteem and official in the *British Pharmacopœia*: it still occasionally appears, however, in the London drug market.

Medicinal uses.—China root is still used to some extent in India, in the same manner as sarsaparilla, as a depurative, alterative, anti-syphilitic and aphrodisiac, in decoction (2 ounces to 1 pint, boiled to 10 ounces: dose 2 to 4 ounces).

SODII BIBORAS.

Biborate of Sodium: Borax.

Vern.—*Beng.*—Sohágá; *Hind.*—Sohágá, Tinkál; *Sans.*—Tankana; *Tam.*—Venkáram; *Tel.*—Velligaram; *Arab.*—Burak-es-Saghah; *Pers.*—Tinkar, Bureh; *Thibetan.*—Chú-sal.

Borax was known to the ancient Hindús from a very remote period: it is believed that its uses were first discovered in India, and that the first supplies of the article received in Europe were from this country.

It is brought to India in considerable quantities, about 50,000 maunds (35,730 cwts.) yearly, carried on the backs of sheep and goats across the frontier from Nepal and Thibet, where it occurs in the waters of certain lakes, and from Persia. In Thibet there is a chain of salt lakes, one

of which is said to be about 20 miles in circumference and supplied by brackish springs rising from the bottom, the waters of which contain borax associated with common salt. The borax crystallizes on the edges and shallows of the lakes and is taken up in large masses, broken up, dried and sent, in the impure state, to India, where it is roughly purified by re-crystallization at places on the frontier. It was formerly exported to England, but is now being superseded by artificial manufacture and by borax deposits in more accessible parts of the world.

Indian borax is very largely used by Native gold and silver-smiths and by potters as a glaze, and it is easily obtainable in all the bazárs.

Medicinal uses.—Borax is given internally as a diuretic, and emmenagogue (dose 5 to 30 grains): externally as a local sedative and antiseptic lotion, and in aphtheæ and sore mouth or throat, the official *Mel Boracis* and *Glycerinum Boracis* being useful preparations. It is also effectual as a detergent lotion in certain skin diseases—pruritus, psoriasis and eczema. It sometimes enters into the composition of pills curative of enlarged spleen.

SODII CARBONAS.

See BARILLA.

SODII CHLORIDUM.

CHLORIDE OF SODIUM: COMMON SALT.

Vern.—*Beng.*—Lavan, Nún, Lun; *Hind.*—Nimak, Lon; *Sans.*—Lávana; *Bom.*—Míthú; *Tam.*—Uppu; *Tel.*—Lavanam.

"In India salt has been lavishly provided by Nature; it is dissolved in a wide expanse of sea which lashes the shores of the Peninsula; is stored up in mines; is spread

out in salt-impregnated lakes and marshes; and is found to effloresce at many localities in the interior and on the seaboard.

"In Upper India, with a population of over 100 millions (including the Punjáb, North-West Provinces, Oudh, Rájputána and Central India), only local salt is consumed, of which there are practically inexhaustable sources in mines in the Punjáb and in the salt lakes and marshes of Rájputána. Some salt from Thibet is imported into the Himálayan districts of Kumaon and Gharwál. Earth-salt is made under treaty with the British Government in the feudatory States of Gwalior, Dattia and Bikanir, and a little salt is also made in the Patiala State in the Punjáb."*

The salt supply of India is almost completely under excise control and yields an annual revenue of about 8 crores of rupees (or 8 millions sterling).† The preparation of salt by lixiviation of saline soils or by solar evaporation of the water of brine wells is practically prohibited except in the regions indicated above, and the impure product of local manufacture is almost entirely superseded by Cheshire salt, which is imported in enormous quantities, chiefly from Liverpool, as ballast for ships coming to Calcutta, Chittagong and Rangoon for Indian produce.

Black salt (*Bit-núm*) is prepared for medicinal purposes by heating the crude common salt with myrobalans. It is regarded as a digestive.

Khari-núm, an impure sulphate of soda, is produced at the salt works by crystallization from brine. It is used to some extent as a saline purgative for cattle.

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* Excerpt from a note on Salt by Mr. G. F. Buckley, Superintendent, Northern India Salt Revenue, in Watt's *Dictionary of the Economic Products of India*.

† Computed at the nominal rate of exchange—2 shillings per rupee.

Medicinal uses.—In addition to its great importance as a dietetic agent, common salt is a good antiseptic. In large doses (2 to 4 drachms) in so ution it acts as an emetic.

SOLANUM DULCAMARA.

DULCAMARA : BITTER-SWEET.

Vern.—*Ind.*—(The Berries) Anab-es-sálab.

A shrub, belonging to the *Solanaceæ*, met with in Kashmír. The young shoots or STEMS and LEAVES are used in medicine in India, and the red BERRIES are imported, according to Dymock, from Persia into Bombay.

The drug contains a peculiar bitter-sweet principle (hence the popular name) which has been believed to consist of a poisonous alkaloid, named *Solanine*, resolvable into sugar and *Solanidine*. The characteristic principle is now believed to be *Dulcamarin*, a yellowish substance, not an alkaloid, which has at first a bitter and subsequently permanently sweet taste. Solanine is common to several species of *Solanum*, including the potato, in which it is, however, rendered innocuous on boiling.

Medicinal uses.—Dulcamara is almost completely neglected in European medicine : it is still used by Indian physicians and considered alterative and diuretic, usually in decoction. The berries are similarly employed.

SOLANUM INDICUM.

Vern.—*Beng.*—Byakurá ; *Hind.*—Barhantá ; *Sans.*—Vrihati Bhantáki.

A plant of the *Solanaceæ*, common all over India. The ROOT is one of the drugs required in the preparation of the much esteemed *Dasamula Kvatha*, or decoction of ten drugs,

of Hindú medicine. It is seldom used alone, but is regarded as diuretic, useful in dropsy. The ROOT of *S. xanthocarpum* (*Kantakari*) is similarly employed. The SEEDS of these plants are largely used for the cure of toothache. The vapour of the burning seeds relieves the pain.

SOLANUM MELONGENA.

THE EGG-PLANT: BRINJAL.

Vern.—*Beng.*—Begún; *Hind.*—Brinjal; *Sans.*—Bártáku; *Bom.*—Baigana.

The egg-plant, another of the *Solanaceous* species, is extensively cultivated all over India for its FRUIT, which is used by both Europeans and Natives as a culinary vegetable. It is white, ovoid and somewhat similar in appearance to an ordinary hen's egg, but much larger. There are several varieties in cultivation differing in shape and colour. It is the "aubergine" of the French, with whom it is popular as a vegetable. It is insipid and uninviting even when cooked. The fruit has lately been noticed* as "an excellent remedy for those suffering from liver complaints."

SOLANUM NIGRUM.

Vern.—*Beng.*—Kákmáchi; *Hind.*—Gurkamai; *Sans.*—Káka máchai; *Bom.*—Kámuni; *Tam.*—Manattak-kali; *Tel.*—Kamanchi-chettu.

A plant of the order *Solanaceæ*, common throughout India. It has the same chemical constituents as *S. Dulcamara*, the alkaloid solanine having been first isolated from this plant.

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* *British Medical Journal*, April 6, 1895.

Medicinal uses.—The black BERRIES are available in the bazárs in some parts of India. They are believed to have alterative and diuretic properties. The LEAVES and young STEMS are reputed to have similar properties, a fluid extract being recommended in dropsy, in doses of ½ to 2 drachms.

SOYMIDA FEBRIFUGA.

Syn.—SWIETENIA FEBRIFUGA.

THE INDIAN RED-WOOD TREE.

Vern.—*Beng.* and *Hind.*—Rohun, Rohan; *Sans.*—Rohuna *Tam.*—Shemmarum; *Tel.*—Somida-manu.

A large forest tree, belonging to the mahogany order; *Meliaceæ*, common in the North-West and in Central, and Southern India. The BARK, occurring usually in half quills of a rich red-brown colour, is to be regarded as an astringent tonic. It contains tannic acid and an undetermined resinous bitter principle.

STROPHANTHUS.

Several species of the *Strophanthus* genus, natural order *Apocynaceæ*, are indigenous to tropical India. None are however used medicinally. An allied African species, *S. Hispidus*, var. *Kombé* yields the Strophanthus SEEDS which have become a most important agent in modern medicine. Its cultivation has been tried experimentally, and with some success, in the Royal Botanic Gardens, Calcutta.

The seeds are poisonous: they afford the Kombé arrow poison of Africa. A tincture prepared from them is now much used, in doses of 2 to 10 minims, as a heart tonic and diuretic, its action resembling that of digitalis, though more powerful and non-cumulative. The active principle is a

glucoside *Strophanthin* which has been resolved into glucose and *Strophanthidin*. It has not been ascertained whether the Indian species contain *Strophanthin*.

STRYCHNOS IGNATII.

St. Ignatius' Beans.

The Seeds of a tree growing in the Phillipine Islands, natural order *Loganiaceæ*. They are occasionally to be met with in the drug bazárs of the large cities in India and are said to be used in cholera. They are roundish or oval, and usually about an inch in length, varying much in size, and contain the same alkaloidal constituents as nux-vomica seeds—*Strychnine* and *Brucine*, in varying proportion, about 1·5 per cent. of the former to 0·5 per cent. of the latter. The glucoside *Loganin* is also believed to be present.* They are sometimes utilized in Europe for the strychnine which they yield in somewhat larger quantity than nux-vomica. A tincture (known as *Tinctura Ignatiæ*) is also prepared (1 in 10) and administered in doses of 3 to 20 minims as a nervine tonic. A similar preparation is used in homœopathic medicine.

STRYCHNOS NUX-VOMICA.

The Nux-vomica or Strychnine Tree: Snake-wood.

Vern.—*Beng.*—Kuchilá; *Hind.*—Kuchlá; *Bom.*—Kájra; *Tam.*—Yetti-kottai; *Tel.*—Mushti-vittulu.

A moderate sized evergreen tree, 40 or 50 feet high, wild and plentiful throughout tropical India, and extending southwards to Madras and the Travancore and Coromandel Coasts. Natural order *Loganiaceæ*. The lozenge-like

* F. Ransom, F.C.S., British Pharmaceutical Conference, 1893.

flattened, round SEEDS separated from the orange-coloured pulpy fruit and washed and dried constitute the drug, nux-vomica.

The active constituents are two alkaloids, in varying proportions—*Strychnine* (0·2 to 0·5 per cent.), and *Brucine* (0·12 to 1 per cent.) in combination with *Strychnic* or *Igasuric Acid* as igasurates. [In a sample of seeds from Ceylon, Dunstan and Shortt found over 5 per cent. of total alkaloids D.H.] The probable existence of a third crystalline principle, named *Igasurine,* has long remained unconfirmed. A glucoside, named *Loganin,* is present in the pulp of the fruit and to a small extent in the seeds. Nux-vomica also contains mucilage and sugar (6 per cent.). The BARK and WOOD, which are also used medicinally in India contain brucine and the LEAVES contain 0·3 per cent. of brucine (Hooper, 1890), no strychnine having been detected. The pulp of the fruit contains strychnine, it is nevertheless eaten with avidity by certain birds which appear to be insusceptible to the action of the poison.

The galenical preparations of nux-vomica in the *British Pharmacopœia* are standardized, the extract to contain 15 per cent. of total alkaloids, and the tincture (which is now prepared from it, instead of from the seeds as formerly) to 1 grain of alkaloids in each fluid ounce. According to an analysis of 25,500 prescriptions * dispensed in various parts of the world, nux-vomica is the most frequently employed drug in the *Materia Medica.* The extract and tincture find a place in all the pharmacopœias. The drug is similarly one of the chief agents in homœopathic medicine.

The seeds are exported very largely from Cochin, in Southern India and from Bombay, Madras and Calcutta,

* *The Extra Pharmacopœia*—Matindale and Westcott, 8th Ed., 1895·

the total export from India being about 20,000 cwts. annually, almost entirely to Great Britain. It may be noted that practically all the nux-vomica used in India is re-imported, chiefly in the form of extract.

Medicinal uses.—Nux-vomica is a powerful nervine tonic and stimulant: in excess doses a virulent poison producing tetanic convulsions. It is employed in doses of $\frac{1}{4}$ to 2 grains of the extract and 5 to 20 minims of the tincture.*

The powdered seed is also occasionally administered in doses of 1 to 5 grains. Strychnine presents the same therapeutic action and is prescribed in doses of $\frac{1}{32}$ to $\frac{1}{12}$ grain. It is antagonistic to calabar bean and has been used successfully as an antidote to that poison. It is also employed hypodermically as a remedy in narcotic poisoning and against the effects of chronic alcoholism. It has for some years been popularly regarded as an antidote to snake-bite, administered hypodermically ($\frac{1}{15}$ to $\frac{1}{10}$ grain) near the bitten part, favourable results having been obtained in Australia with this method of treatment, but as the result of an exhaustive research by Surg.-Lieut.-Col. D. D. Cunningham, published in 1895,† it has been shown that it is not an antidote chemically or physiologically, to the bites of the poisonous snakes of India. Brucine has been used in epilepsy in doses of $\frac{1}{8}$ to $\frac{1}{2}$ grain in solution.

The BARK and WOOD are commonly used as bitter tonics in the native habitat of the tree. An OIL, obtained by heating the fresh seeds, is used externally in rheumatism.

Substitution.—The bark is known in Europe as "false angostura bark", having on one occasion been sold in the

* A *resumé* of the therapy of the drug and of strychnine, by the author, is given in the *Indian Medical Record*, 16th Nov. 1894.

† Department of the Sanitary Commissioner with the Government of India.

London drug market by mistake for the true angostura or cusparia bark. It has been repeatedly substituted in mistake, and with fatal effect, by ignorant drug sellers in the bazárs in India for the *kurchi* bark (*Holarrhena antidysenterica*), the similarity of this name with *kuchlá* and the slight resemblance of the drugs, probably causing the confusion. The simplest distinguishing feature is the intensely bitter taste of the nux-vomica bark as compared with that of the *kurchi*. The former is also of a dirty white and buff colour externally, and the latter grey, with bright, rust-coloured patches of cork, and white warty excrescences.

STRYCHNOS POTATORUM.

THE CLEARING NUT TREE.

Vern.—*Beng.*, *Hind.*, *Bom.*, *&c.*—Nirmali; *Sans.*—Kátaka, Ambú-prasáda; *Tam.*—Tetran-kottai; *Tel.*—Chilla-chettu.

A small tree, of the *Loganiaceæ*, belonging to Bengal, Central and Southern India and Burma. It is notable on account of its SEEDS which have been used from early times in India for their property of clearing muddy water, hence their popular name. The seeds are button-shaped and contained in a black pulpy fruit about the size of a cherry. They are commonly sliced and rubbed round the sides of the unglazed earthen vessels in which drinking water is stored, having the effect of acting as a mechanical precipitant of suspended matter present in the water. The action is clearly due to albumen, which becomes evident as a thick mucilage on simple maceration of the seed in water and yields a white coagulum on boiling. The seeds were formerly used medicinally in affections of the eyes but are not now employed.

STYRAX BENZOIN.

THE GUM BENZOIN TREE.

Vern.—*Ind.*—(The Resin)—Lubán.

The tree is a native of the Malay Peninsula (Lower Siam) and Sumatra: natural order *Styraceæ*. It yields, along with probably one or two other species, the balsamic resin, Gum Benzoin or Gum Benjamin, of commerce, which is largely imported into India (about 12,000 cwts. annually) from Penang, chiefly into Bombay, and used throughout India as an incense. It is also exported to Europe. Gum Benjamin is the source of *Benzoic Acid*, which is largely used in medicine. It also contains *Cinnamic Acid*. Dymock says that in the Bombay bazár an artificial benzoin is manufactured in which pieces of silicate of magnesia are imbedded in common American resin and sold to the poor, who use it for religious purposes.

Medicinal uses.—Stimulant and expectorant. The compound tincture of benzoin is employed as an expectorant and inhalant, and externally as a styptic and antiseptic.

SULPHUR.

Vern.—*Beng.*—Gandrok; *Hind.*—Gundhak; *Sans.*—Gandhaka.

Sulphur occurs naturally in some parts of India, in Nepal, Kashmír and Afghánistán and in Burma. Country sulphur is little used, however, although a pure variety of washed sulphur known as *amlasa gundhak*, may be obtained in the bazárs of Bengal.

Medicinal uses.—These are well-known. Sulphur is used internally as a laxative and alterative in skin diseases; externally in similar affections and in rheumatism.

SWERTIA CHIRATA.

Syn.—Ophelia Chirata : Gentiana Chirayita. Chirata : Chiretta.

Vern.—*Beng.*—Chirétá ; *Hind.*—Charayatah, Kiráyat ; *Sans.*—Kirata-tikta ; *Bom.*—Chiraita ; *Tam.*—Nila-vembu ; *Tel.*—Nela-vemu.

An annual erect herb of the gentian order, 2 to 4 feet high, indigenous to the temperate Himálaya, at altitudes above 4,000 feet, from Simla to Nepal and Bhutan.

The drug consists of the entire, dried Plant, including the branched stems and roots. It is official in the *British Pharmacopœia* and in that of the United States. It is plentiful in the bazárs in Bengal, and brought down in large quantities from Nepal to Calcutta packed in square bales of about 1 cwt. each, made up of small bundles of 1½ to 2 lbs., bound with a slip of bamboo, in which form it is exported to London.

The principles to which the intensely bitter taste of chiretta is due, are *Ophelic Acid* and *Chiratin*.

Medicinal uses.—Chiretta has been used in India as a bitter tonic and stomachic from a remote period. It is not used to any large extent in European medicine, probably on account of its intense and persistent bitterness, considerably exceeding that of gentian. It is antibilious, and has no tendency to constipation, hence much esteemed in India as a remedy in liver disorder, preferably in the form of liquid extract or of the official tincture and infusion.

Substitutes.—Chiretta is seldom adulterated in India. Herbs of other species have occasionally been found intermixed, usually in mistake. The plant, *Swertia angustifolia*, known as the sweet chiretta (*mitha kirayat*), and several others of the same genus have been recognised : they are deficient in bitterness as compared with the true drug.

The stems of madder, *Rubia cordifolia* (*manjít*), have also been said to have been discovered in chiretta consigned to London.

The true drug is frequently confused in India with the *creat, Andrographis paniculata* (q. v.), which is sometimes known as Indian Chiretta. This article was lately offered for sale as chiretta in the London drug market.*

SYMPLOCOS RACEMOSA.

THE LODH TREE.

Vern.—*Beng., Hind., &c.*—Lodh, Lodhra; *Sans.*—Lodhra, Tilaka.

A small tree of the lower hills of Bengal, Assam and Burma: natural order *Styraceæ*. Lodh BARK is easily obtainable in the Calcutta bazár, and is soft, friable and fawn-coloured: it is occasionally used in dyeing. It was formerly exported to Europe and known as Lotur bark. Three alkaloids have been isolated from the bark, named respectively, *Loturine, Colloturine* and *Loturidine. Kinovin* (Quinovin) has also been separated. The bark contains no tannin.

Medicinal uses.—The BARK has been used in Hindú medicine as a mild astringent. It has been recommended† in doses of 20 grains in powder, mixed with sugar, as a useful remedy in cases of menorrhagia, due to relaxation of

* A description by Mr. J. S. Ward, with a figure, appears in the *Pharmaceutical Journal* (IV), 1315, 7th Sept. 1895, and an illustrated account of the histology of *Andrographis paniculata* by Professor H. G. Greenish, *Pharmaceutical Journal* (IV), 1325, 16th Nov. 1895.

† By Dr. T. E. Charles, formerly Professor of *Materia Medica* in the Medical College, Calcutta, and the author—*Pharmaceutical Journal*, 24th Sept. 1881.

the uterine tissue, given two or three times a day for three or four days. A fluid extract, in half-drachm doses would be a more suitable form for exhibiting the remedy in such cases.

TAGETES ERECTA.

THE FRENCH MARIGOLD.

Vern.—*Beng.* and *Hind.*—Genda; *Bom.*—Makhmal, Gul-jáfári; *Mar.*—Rojia-cha-phul.

This plant and *T. patula*, the African marigold, belonging to the natural order *Compositæ*, are commonly cultivated in Indian gardens, their bright yellow flowers being much admired and made into garlands to hang round the necks of idols. The flowers yield a yellow dye which is occasionally employed by poor people. The juice of the FLOWERS is said to be occasionally used medicinally as a purifier of the blood and as a remedy in piles. It is, however, little used or known. *Genda* has been referred in some books to *Calendula officinalis*. This is an error, the latter being a rare plant of the Punjáb and not found in Bengal.

TAMARINDUS INDICA.

THE TAMARIND TREE.

Vern.—*Beng.*—Tentúl, Ambli, Imlí; *Hind.*—Amlí, Amlicá; *Sans.*—Tintidi, Amliká; *Bom.*—Chintz; *Tam.*—Puliyam-pazham; *Tel.*—Chinta-pandu.

A handsome evergreen tree of the *Leguminosæ*, commonly 50 to 70 feet high, cultivated throughout India and Burma, and in tropical countries generally. It is believed by botanists to be indigenous to Southern India. The

FRUIT has been known and valued in India from a remote period: the name (*tamar-hindi*) is of Persian origin and means "Indian date." The preserved pulp of the tamarind fruit is official in the *British Pharmacopœia.* It consists of a reddish-brown, moist, sugary mass—enclosing the stringy fibres found within the pulp, and the seeds, enclosed in a tough membranous coat—having been prepared by pouring boiling syrup over alternate layers of the fruit and sugar. A corresponding product occurs in India as a black solid mass of the pulp, more or less freed from fibre and husk, pressed into round cakes and preserved with salt. This form is known in the Home markets as East Indian or Black Tamarinds and the former as West Indian or Red Tamarinds.

The acidulous pulp contains acid tartrate of potassium (cream of tartar), tartaric, citric, acetic and a trace of malic acids. A peculiar exudation occurring on an old tamarind tree, observed by Mr. J. G. Prebble and recorded in the *Pharmacographia Indica,* was found to consist almost entirely of oxalate of calcium and flows from the tree in a liquid or syrupy state, afterwards drying into white crystalline masses.

Tamarinds enter largely into the composition of Native dietary in curries, chutnies, and boiled in water and sweetened as a cooling *sherbet;* the fruit could be exported from India with advantage if preserved in the same manner as the West Indian.

Medicinal uses.—The pulp of the fruit is cooling, carminative and laxative: it is used as an adjunct to other laxatives as in the confection of senna and presumably as the basis of the preparations of which "Tamar-Indien" is a type. It is a useful addition to cough mixtures.

TAMARIX GALLICA.

THE TAMARISK.

Vern.—(The Galls)—*Beng.* and *Hind.*—Barí-máín; *Sans.*—Jhávuka; *Bom.*—Magiya-máín; *Pers.*—Gazmázaj. (The Manna)—Gazangabín.

A small tree or shrub belonging to the natural order *Tamariscineæ*, found throughout India, common in Persia and Afghánistán. The GALLS produced on this shrub, and a smaller kind produced on *T. articulata*, common in Sind and the Punjáb, are occasionally found in the bazárs of Western India and used as a substitute for oak-galls. The galls of *T. gallica* are somewhat smaller than oak-galls and three-angled; both varieties equal the true galls in their yield of tannic acid.

A variety of this species (var. *mannifera*) yields the tamarisk manna which is known in the bazárs of Northern India under the Persian name given above. It exudes on the leaves and slender branches in consequence of the puncture of an insect and solidifies into a more or less solid mass, liquefying on keeping to a honey-like consistence. It is occasionally used in India as a mild laxative.

TARAXACUM OFFICINALE.

THE DANDELION.

Vern.—*Hind.*—Dúdal, Baran, Kánphúl.

This familiar *Composite* plant is found on the temperate Himálaya, common in Thibet, and on the Nilgiris. It is cultivated at Saharanpur for the Medical Stores Departments of Bengal and the North-West Provinces, that of Madras being supplied from Ootacamund where the plant grows in abundance as a weed in the cinchona plantations.

The ROOT is officinal: as sold in the bazárs, it is smaller than the imported root. The bitter principles are *Taraxacin* and *Taraxacerin*, with inulin, a common constituent of the roots of many members of the order *Compositæ*, and sugar and levulin, to which is due the sweetish taste of the root.

Medicinal uses.—Dandelion ROOT is a valuable hepatic stimulant, and mild tonic and diuretic. A popular combination is that of the fluid extract with podophyllin, which may be reckoned a good remedy in liver congestion. Another popular form is the admixture with coffee in the same manner as chicory root (see *Cichorium*).

Substitutes.—Dymock (*Pharmacog. Ind.*) enumerates four plants of the same natural order, yielding roots which are substituted for dandelion in Western India, viz., *Launæa pinnatifida*, *Lactuca Heyneana*, *Sonchus oleraceus* and *Emilia sonchifolia*, the latter being a common weed in Indian gardens and known in Bengal as *Shudimudi*.

TAXUS BACCATA.

THE YEW.

Vern.—*Hind.*—Thúno, Birmí, Geli, Lúst.

A large evergreen tree of the temperate Himálaya and the Khasia Hills: natural order *Coniferæ*.

The sprigs or young branches and the linear LEAVES are exported to the plains and used in medicine. They are known in the bazárs of Bombay as *Tálispatra*, and were believed by Dymock to be the true *Tálispatra* of ancient Sanskrit *Materia Medica*. The drug sold under the same name in the Calcutta bazár consists of the leaves of *Abies Webbiana* (q. v.).*

* The name, *Tálispatra*, has also been applied to the leaves of *Cinnamomum Tamala* and to those of *Flacourtia Cataphracta*.

Yew leaves contain a volatile oil, tannic acid and a toxic crystalline alkaloid, named *Taxine*. The leaves and seeds are poisonous: the red pulp of the fruit contains no poisonous principle and is eaten by the hill tribes.

Medicinal uses.—The leaves and fruit have been reputed to have emmenagogue properties: they are little used except in domestic medicine. *Tálispatra* was recommended as an expectorant in phthisis, and the different drugs now sold under this name are used as such.

TERMINALIA ARJUNA.

THE ARJUNA MYROBALAN.

Vern.—*Beng.* and *Hind.*—Arjún, Kahú; *Sans.*—Arjuna, Kukubha; *Bom.*—Arjuna-sadra; *Tam.*—Vella-marda; *Tel.*—Yermaddi.

A large deciduous tree of the Lower Himálaya, Bengal, Burma, Central and Southern India and Ceylon. Natural order *Combretaceæ*. The BARK is astringent, containing about 15 per cent. of tannin. It is used to prepare a lotion applied to ulcers. The bark also contains a large proportion (over 30 per cent.) of calcium carbonate, minute crystals of which may be observed in the pinkish, quilled bark.

TERMINALIA BELERICA.

BELERIC MYROBALANS.

Vern.—*Beng.*—Baherá, Bohorá; *Hind.*—Bhairá, Bahera, Barlá; *Sans.*—Vibhitaka, Bahira; *Bom.*—Behada, Vahela; *Tam.*—Tánrik-káy; *Tel.*—Tándra-káya.

A large tree, also belonging to the natural order *Combretaceæ*, common in the forests of India and Burma. The astringent FRUIT is one of the "myrobalans" of commerce.

There are two principal varieties, yielded by different trees, one globular in form, ½ to ¾ inch diameter, the other ovoid and about twice the size: both contain tannin in variable proportions. They are collected and sold at auction by the Forest Department and largely exported for dyeing and tanning purposes. An insoluble gum exudes in some quantity from the bark: it is little used, but is said to be sometimes mixed with soluble gums. The kernel of the fruit is popularly believed to act as a narcotic and intoxicant when taken internally; this has now, however, been disproved in both varieties. An oil expressed from it is used as a dressing for the hair.

Medicinal uses.—The unripe FRUIT is purgative: the fully ripe fruit is astringent. The latter is used in dropsy, piles and diarrhœa. It is an ingredient of the famous *triphala* or fruit triad, a remedy much prescribed in a large variety of cases. (*See* also *T. chebula* and *Phyllanthus emblica.*)

TERMINALIA CATAPPA.

THE INDIAN ALMOND.

Vern.—*Beng.*—Banglá-badám; *Hind.*—Jangli-badám, Hindi-badám; *Mal.*—Katappa.

A large ornamental tree of the *Combretaceæ*, commonly cultivated throughout India. The KERNEL of the fruit is not unlike the almond in taste and yields to expression 50 per cent. of an oil which may be regarded as a good substitute for almond oil. It has the same taste and odour, although slightly darker in colour: it deposits stearin at a temperature under 5° C. The kernel is about half the size of the true almond and nearly cylindrical; they are also known as "leaf nuts." The bark and leaves contain tannin.

TERMINALIA CHEBULA.

Syn.—MYROBALANUS CHEBULA.

THE CHEBULIC OR BLACK MYROBALAN.

Vern.—(The Tree) *Beng.*—Hárítákí ; *Hind.*—Har, Harrá.—(The Fruit) *Beng.*—Hora, Hárítaki ; *Hind.*—Har, Hara, Bálhar, Zanghí-har ; *Sans.*—Haritaki, Abhaya, Pathyá ; *Bom.*—Hardá, Harle, Hirada; *Tam.*—Kaduk-kái ; *Tel.*—Karakkáya —(The Galls) *Hind.*—Háritakí-phul.

Another large tree of the *Combretaceæ* order, yielding FRUITS which constitute the greater part of the "Myrobalans" of commerce. It is wild in the forests of Northern India, the Central Provinces and Bengal, common in Madras and in Mysore and in the Southern portion of the Bombay Presidency, where it forms an important source of revenue for the Forest Department. It is found and cultivated, in several varieties, chiefly vars. *typica* and *citrina*, the latter believed by some botanists to be a distinct species.

The dried fruits form one of the most valuable of Indian tanning materials, and they are very largely exported from India for this purpose, chiefly from Bombay. The better qualities contain about 25 per cent. of gallo-tannic acid residing in the pulp surrounding the seed, which is itself devoid of astringent principles. The GALLS produced on the leaves are rich in tannic acid and are used locally for tanning and as a mordant in dyeing.

Two principal kinds of chebulic myrobalans are sold in the bazárs—one smaller than the other—the smaller being used in medicine and consisting probably of the young or unripe fruits. They are somewhat ovoid in shape, pointed, about an inch in length, shrivelled and yellowish-brown to black externally: they sink when placed in water. The

larger fruits are rounder and smoother: they are chiefly used in tanning.

The chemistry of myrobalans has received considerable attention in recent years. Chebulic myrobalans may contain varying proportions of gallo-tannic acid according to the stage of maturity to which the fruit has reached, the fully grown fruits containing less of the tannic principles. Mr. A. Campbell Stark* found 18·8 per cent. of tannin in a sample of commercial ground myrobalans.

Fridolin (1884) isolated an organic acid which he named *Chebulinic Acid*, and which he believed to be the source of the gallic and tannic acids detected by previous observers in the fruit. Another research (*Year Book of Pharmacy*, 1893, p. 156) resulted in the isolation of about 3·5 per cent. fo an acid named *Chebulic Acid*, "in addition to a large proportion of tannin," the latter named acid being probably identical with the former. Another contribution to the literature of the subject is recorded in the *Pharm. Journ.*, 27th June 1891, in which it is stated that the tannin of myrobalans had been found to be a mixture of two tannins, one of which is the glucoside of gallic acid and named *Ellagic Acid*, and the other a tannic acid proper, named *Ellagotannic Acid*.

A green-coloured oleo-resin has been extracted from the fruits and named *Myrobalanin*. A transparent fixed OIL is expressed from the kernels.

Medicinal uses.—The dried unripe FRUIT, notwithstanding the astringent nature of its constituents, is very commonly used in India as a purgative and antibilious: 1 to 2 drachms of the pulp, corresponding to 3 or 4 fruits, is usually sufficient and may be taken in decoction combined

* British Pharmaceutical Conference, 1892.

with aromatics. It is an essential ingredient of the *triphála* or three fruits (the chebulic, beleric and emblic myrobalans), a favourite remedy of the *kavirajs*, and a popular domestic aperient medicine and liver regulator and adjunct to other medicines. A conserve is made of the large, fully ripe fruit which is considered a good digestive.

Substitute.—The fruits of *T. tomentosa* are sometimes mixed with those of *T. Chebula*. They are smaller and much inferior in every respect.

THALICTRUM FOLIOLOSUM.

Vern.—*Hind.*—Pinjari, Pílíjarí, Gurbiani; *Bom.*—Maríran.

An herb, belonging to the natural order *Ranunculaceæ*, found on the temperate Himálaya and the Khasia Hills. The Roots, which are not unlike liquorice in appearance, but very bitter, are exported to the plains and sold in the shops under the name of *Pílíjarí* or *Piaranga*. Thalictrum root contains the alkaloid *Berberine*, combined in such a form, as in *rusot*, as to be readily soluble in water.

Medicinal uses.—A cold infusion of the Root is used as a lotion for ophthalmia. It is also a valuable tonic in dyspepsia and has been found to possess antiperiodic properties.

THEVETIA NERIIFOLIA.

The Exile or Yellow Oleander.

Vern.—*Beng.*—Kolkephul; *Hind.*—Pílá-kanér; *Tam.* and *Tel.*—Pachchai-alari.

A plant commonly cultivated as an ornamental shrub in gardens in the plains. Natural order *Apocynaceæ*. The Seeds contain a fixed Oil, to which poisonous properties have been attributed. Dr. Warden has discovered that

the oil, when pure, is quite inert, but that a highly poisonous alkaloid, which he has named *Thevetine*, may be isolated from the cake left after expression of the seeds. It is probably allied in its nature to the alkaloids of *Nerium odorum* (q. v.). The milky JUICE of the plant is poisonous. The BARK is bitter, cathartic and antiperiodic in small doses of a tincture, but its use is attended with considerable danger.

TINOSPORA CORDIFOLIA.

Syn.—COCCULUS CORDIFOLIUS.

Vern.—(The Root) *Beng.*—Gulanchá, Gurach, Gilo; *Hind.*—Gulanchá, Gurch, Gul-bél; *Sans.*—Gudúchi, Amrita; *Bom.*—Gulwail, Gulavela; *Tam.*—Shíndil-kodi; *Tel.*—Tippa-tége; *Burm.*—Singo-moné.

A common climbing shrub, growing on *Ním* and other high trees in tropical India and Burma, and Ceylon. Natural order *Menispermaceæ*. The whole PLANT (STEM, LEAVES and ROOT) is used in medicine, preferably in the fresh state: it may be readily obtained in the dried state in any bazár. A dry aqueous extract (Hind.—*Paló* or *Satí-gilo*) prepared from the stem and root, is used in Native medicine. It is of a dirty white colour and consists almost entirely of starch. Flückiger detected a trace of berberine in the stem, but no crystallizable bitter principle could be isolated.

A tincture, infusion and extract (the latter corresponding to *paló*) was made official in the *Pharmacopœia of India*.

Medicinal uses.—The herb and the extract have undoubted tonic and alterative properties and in a less degree antiperiodic and diuretic. They have been found useful in chronic rheumatism. A fluid extract of the plant is probably the most useful preparation.

TODDALIA ACULEATA.

Syn.—SCOPOLIA ACULEATA.

Vern.—*Beng.*—Kada-todali; *Hind.*—Jangli-kalí-mirch; *Sans.*—Kánchana, Dahana; *Bom.*—Limri; *Tam.*—Mila-karanai; *Tel.*—Konda-kashinda.

A climbing shrub (natural order *Rutaceæ*) found in the Lower Himálaya, common in Bhutan at altitudes of about 5,000 feet and in Western and Southern India. The fresh ROOT-BARK and the whole plant are pungent and aromatic. The former is well known to the Natives and used in medicine in Southern India and the ripe golden coloured pungent, unripe berries are pickled and eaten. The root-bark, separated from the white woody root, was included in the *Pharmacopœia of India:* it was formerly known in European medicine as "Lopez root," but has long ago fallen into disuse. Messrs. Hummel and Perkin have recently found that the alkaloid berberine in the root-bark is the source of the bitterness and colouring matter. The LEAVES yield to distillation a yellowish-green volatile oil having an odour somewhat resembling that of citron, and containing citronella-aldehyde. [D. H.]

Medicinal uses.—The fresh ROOT-BARK given in infusion (1 to 2 ounces) or fluid extract (½ to 2 drachms) is a useful stimulating tonic and carminative. The drug has decided antiperiodic and antipyretic properties useful in simple fever.

TRAPA BISPINOSA.

THE INDIAN WATER CHESTNUT: THE SINGHARA NUT.

Vern.—*Beng.*—Paníphal; *Hind.*—Singhárá; *Sans.*—Sringátaka.

An aquatic plant found commonly floating on the surface of lakes, tanks and pools throughout India. Natural order

Onagraceæ. The white kernel contained within the red-brown, spiny fruit is used as a food by large communities of the poorer classes in Northern India. The plant is cultivated for this purpose in the North-West Provinces and in Kashmír, affording in some places a source of land revenue in rents from tanks devoted to its culture. It abounds in starch and resembles the chestnut in flavour.

An analysis of the kernels by Mr. D. Hooper (*Pharm. Journ.* (3) XXIV, 8th July 1893) showed the nutritive value to be equal to that of rice. Plants of the *Trapa* species have been noted as remarkable for their power of taking up manganese. The same investigator records that that metal was found in small quantity in the kernel while the pericarp was very rich in manganese.

Medicinal use.—The fruits are considered useful in some parts of Northern India as useful in bilious affections with diarrhœa.

TRIBULUS TERRESTRIS.

Syn.—T. LANUGINOSUS.

THE CHHOTA GOKERU.

Vern.—*Beng.*—Gókhrú, Gokshura; *Hind.*—Gokhuru, Chhota-gokhru; *Sans.*—Ikshugandhá; *Bom.*—Lahana-gokhru, Mitha-gokhru; *Tam.*—Nerunji; *Tel.*—Palleru-mullu; *Mal.*—Neringil.

A trailing plant common in sandy soil throughout India, plentiful in the North-West Provinces and in Madras. Natural order *Zygophylleæ.* The whole PLANT, including the root and the FRUIT, are used medicinally in India.

The fruit is covered with stout, blunt spines; it has a faintly aromatic odour and little taste. The authors of the *Pharmacographia Indica* have isolated from it an

alkaloidal principle, a fat and a resin, to the latter of which the aroma of the drug is supposed to be due.

The *burra-gokhrú* is the fruit of *Pedalium murex* (q. v.).

Medicinal uses.—The plant and more especially the dried FRUIT, in infusion, have long been much esteemed in India as possessing diuretic properties, useful in spermatorrhœa and diseases of the genito-urinary system. Mr. Thomas Christy, F.L.S., London, author of *New and Rare Drugs*, introduced to the medical profession some years ago a fluid extract and syrup of the *chota-gokerú* which were used with much success as remedies in spermatorrhœa and kindred affections.

TRICHOSANTHES DIOICA.

Vern.—*Beng.*—Patól ; *Hind.*—Palval, Parwar ; *Sans.*—Patola.

A climbing plant common in Bengal, and cultivated in Northern India and the Punjáb. The FRUIT is a pepo and has properties resembling those of colocynth, belonging, as it does, to the same natural order, *Cucurbitaceæ*. In Western India the fruit of *T. cucumerina*, the Wild Snake Gourd (*janglí-chi-chóndá*) is, according to Dymock, regarded as the *patola*. The dried pulp of the unripe fruit of either species may be regarded as purgatives. They were formerly considered febrifuge.

From the rind and pulp of the fruits of another gourd *T. palmata* (Hind.—*lal-indráyan*) commonly sold in the bazárs of India has been isolated a bitter principle resembling colocynthin to some extent and named provisionally *Trichosanthin*.

TRIGONELLA FŒNUM-GRÆCUM.

THE FENUGREEK.

Vern.—*Beng., Hind., Sans.*—Méthí, Methika.

An annual herb belonging to the natural order *Leguminosæ*, found wild and extensively cultivated in Kashmír,

the Punjáb, and some parts of the Bombay and Madras Presidencies. The SEEDS are exported from Bombay to the extent of over 10,000 cwts. annually. The seeds are small, mucilaginous when placed in water and have a faint odour suggestive of coumarin, which is contained in an allied species (*see* page 188). Flückiger and Hanbury (*Pharmacographia*) found that the air-dried seeds gave off 10 per cent. of water at 100° C., and on subsequent incineration left 7 per cent. of ash, of which nearly a fourth was phosphoric acid. They yielded 6 per cent. of a fœtid fatty oil, having a bitter taste. A later research indicates the presence in the seeds of two alkaloids, *Choline*, a base found in animal secretions, and another, named *Trigonelline*, having a weak saline taste.

Fenugreek is now quite neglected in European medicine although formerly held in some repute. It frequently occurs however in the drug markets, being an important constituent of foods and condition powders for horses and cattle, and used also to some extent in the preparation of curry powders.

Medicinal uses.—The SEEDS have long been valued in India as tonic and carminative. The young plants and aromatic leaves are much used as culinary vegetables and the seeds as a condiment.

TRITICUM SATIVUM.

Syn.—T. VULGARE : T. ÆSTIVUM.

WHEAT.

Vern.—*Beng.*—Gam, Giún ; *Hind.*—Géhún, Kanak ; *Sans.*—Godhumá ; *Bom.*—Gahun ; *Tam.*—Godumai ; *Tel.*—Godmulu.

Indian wheat has attained a position of great importance in the commerce of the country during a comparatively recent period. It is extensively cultivated, in various local

forms or varieties, in the Punjáb and in the North-West, Central and Bombay Provinces, and exported, chiefly from Bombay, Karachí and Calcutta, to the extent, from all India, of about 1,500,000 tons annually.

It is the most important of the cereals, and forms the staple food of a large proportion of the better classes of the people in extensive areas of Northern and Western India which are not dependent upon rice, pulses, millets, and other food-grains. It belongs to the grass order, *Gramineæ*.

The grain consists essentially of starch, about 70 per cent., with nitrogenous (including *gluten*) and albuminoid matters, sugar, gum, oil and phosphates of potassium, m
lime and sodium.

Medicinal uses.—Wheaten flour (*Farina Tritici*, B. P.) is official for making yeast poultice. It is used in domestic medicine as a dusting powder applied over inflamed surfaces, as in erysipelas and burns. Crumb of bread made from wheaten flour is also included in the *British Pharmacopœia*, as *Mica Panis*, for the preparation of charcoal poultice. It is used in pharmacy as a basis for pills containing kreosote and similar medicaments. "Bran," the ground, husked grain, is used in baths in psoriasis and in making poultices.

TYLOPHORA ASTHMATICA.

Vern.—*Beng.*—Antamúl ; *Hind.*—Jangli-pikván ; *Bom.*—Pitmári ; *Tam.*—Náy-pálai ; *Tel.*—Veri-pala ; *Mal.*—Valli-pala.

A small twining plant of the natural order *Asclepiadeæ*, common in the jungles throughout Eastern India, in Bengal, Assam, Southern India and Burma. All parts of the plant, and especially the LEAVES and ROOT contain emetic principles which it was proposed many years ago to utilize

in place of ipecacuanha. The leaves were consequently made official in the *Pharmacopœia of India* at a time when a probable scarcity of ipecacuanha was apprehended, but this and other indigenous substitutes (see *Randia dumetorum* and *Naregamia alata*) for that drug are now seldom employed except in domestic medicine.

Hooper has isolated from the leaves and root a crystallizable alkaloid which he has named *Tylophorine*.

Medicinal uses.—The dried LEAVES and the dried and powdered bark of the fresh ROOT have been administered in doses of 30 to 40 grains as emetic, and 5 to 10 grains as expectorant and diaphoretic. They have also been used in dysentery with good effect, and may be regarded as resembling ipecacuanha in their properties, the dose required being however about double.

UNCARIA GAMBIER.

GAMBIER : PALE CATECHU : TERRA JAPONICA.

Vern.—*Beng.*—Papri ; *Hind.*—Kath, Katha ; *Bom.*—Chinai-katha ; *Mal.*—Gambir.

Gambier is the product of a shrub or bush, natural order *Rubiaceæ*, cultivated in Malacca, Penang and Singapore, and largely in the forests of Johore. It is extracted from the leaves and young shoots by boiling and subsequent evaporation. It is imported into India in considerable quantity in irregular, sometimes partly agglutinated, cubes, and is therefore briefly noticed in this place.

Gambier is closely allied to catechu in its nature and characters : it is commonly known as "pale catechu" and is the "catechu" of the *Pharmacopœia*. It contains the same chemical constituents, principally "tannin" (catechu-tannic acid) in equal quantity (40 to 50 per cent., reckoned

as gallo-tannic acid) and the yellow colouring principle *Quercetin*. *Catechu Nigrum* is the product of *Acacia Catechu* (q. v.) Both are largely used in tanning and medicinally as astringents. Gambier is used very largely in India as an ingredient in *pán-supári*.

Adulteration.—Mr. J. G. Prebble has described* a sophisticated gambier imported into Bombay from Singapore, which he found to contain a large percentage of starch. Mr. Peter MacEwan, F.C.S., in an excellent monograph on gambier,† states that a very light clay or earth is used as an adulterant.

URGINEA INDICA.

INDIAN SQUILL.

Vern.—*Beng.* and *Hind.*—Kándá, Janglí-piyáz; *Sans.*—Vana-palánddu; *Bom.*—Kol-kánda; *Tam.*—Nári-vengáyam; *Tel.*—Nakka-vulli-gadda.

This plant, the *Scilla indica* of Roxburgh, yielding the bulk of the squill of the bazárs, grows throughout India in sandy places near the sea and is found in the Lower Himálaya. It belongs to the natural order *Liliaceæ*. The bulb is the officinal portion, and it is to be preferred when well-formed, but not mature, as the outer coats of the older bulbs are inert. As met with in the bazárs, the drug is believed to consist chiefly of the bulbs, whole and unsliced, of the plant under notice, with those of *Scilla indica*, q. v., frequently mixed. It may be regarded as equal in medicinal value to the official drug from *Urginea Scilla*, cultivated on the shores of the Mediterranean and imported into India.

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* *Pharmaceutical Journal* (3) Vol. XXIV, p. 21, 8th July 1893.

† *Pharmaceutical Journal* (3) Vol. XV, p. 793, 28th March 1885.

It has been used for several years in place of imported squill at the Government Medical Store Depôts in India.

The chemical constituents of squill are a glucoside, *Scillain*, and *Scillipicrin* and *Scillitoxin*, bitter principles. Mucilage, sugar and crystals of calcium oxalate are also present. The Indian drug has been investigated by Assistant-Surgeon Chuni Lal Bose, but not with regard to its relation to the official article. The medicinal properties of squill have been indicated at *S. indica*.

VALERIANA WALLICHII.

INDIAN VALERIAN.

Vern.—*Beng.*, *Hind.*, *&c.*—Tagar, Naháni, Shumeo, Asarún; *Bom.*—Tagar-ganthoda; *Sans.*—Tagara.

Several plants of the *Valerian* species (natural order *Valerianeæ*) are indigenous to the temperate Himálaya, found in Kashmír and Bhután. The most important is the above, the RHIZOMES or root-stocks of which are collected in Afghánistán regularly and exported to the plains for medicinal use and as a perfume. *V. Hardwickii* is also similarly exported into India, and the true valerian, *V. officinalis*, is said to be found in North Kashmír.

The chemical constitution of the roots of *V. Wallichii* approximates very closely to that of the official drug, for which it has been found an efficient substitute medicinally.

It has a more powerful odour and yields a larger proportion of volatile OIL and *Valeric Acid*, on distillation with water.

Medicinal use.—Valerian acts as a stimulant and antispasmodic: its use is indicated in nervous and hysterical symptoms. (*See* also *Nardostachys Jatamansi*.)

VATERIA INDICA.

THE PINEY RESIN OR INDIAN COPAL TREE : WHITE DAMMAR.

Vern.—*Hind.*—Suféd dámar ; *Tam.*—(The Tree)—Dupada. (The Resin)—Vellai-kungiliyam.

A large evergreen tree of the natural order *Dipterocarpeæ*, indigenous to South-Western India, Canara and Travancore. A fine resin, the better qualities not unlike amber, exudes from incisions made in the trunk and is used like copal for making varnishes: it dissolves in turpentine and is less soluble in alcohol. It has been recommended for use in pharmacy in place of the official pine resin. The large, fatty seeds contain nearly half their weight of a concrete OIL, resembling kokum butter (see *Garcinia indica*) in consistence, which is employed locally as an emollient in rheumatism and which might be utilized as a basis for ointments.

VIOLA ODORATA.

THE WILD VIOLET.

Vern.—(The Plant)—*Hind., Bom., Pers., &c.*—Banafshah. (The Flowers)—Gul-i-Banafshah.

This and several closely allied species (natural order *Violaceæ*) are found in Kashmír and the temperate Western Himálaya, above 5,000 feet. The flowering plants, including the root, chiefly of *V. serpens*, are collected for export to the plains and may easily be obtained in the dried state in the drug bazárs of Bengal.

The violet flowers and root contain an emetic principle named *Violin*, believed to resemble emetine in some of its characters : the flowers also contain, in addition to traces of a volatile oil, several peculiar colouring matters and *Viola-quercitrin*, a yellow principle, and sugar.

Medicinal uses.—The FLOWERS are regarded and much used by the *hakims* as cooling and diaphoretic; they have slight aperient and diuretic properties, and are suitably combined with other vegetable laxatives. The ROOT, and the flowers in large doses, are reputed to have emetic properties.

The *banafshah* of the bazárs cannot be said to possess the valuable medicinal properties once attributed to the drug of that name, which probably consisted of *V. odorata.*

VITIS VINIFERA.

THE GRAPE VINE.

Vern.—(Grapes)—*Beng.*—Drakhyaluta; *Hind.*—Angúr, Drakh; *Tam.*—Dirakhsha-pazham; *Tel.*—Drákshá-pandu; *Sans.*—Drákshá, Mridviká; *Pers.*—Kishmish, Munakka.

Grapes are now largely cultivated, in many varieties, in North-Western India, in the Punjáb, Kashmír, Belúchistan and Afghánistán. Natural order *Ampelideæ* (*Vitaceæ*). They have been highly esteemed in India from a very remote period and the ripe FRUITS, partly dried in the sun, "raisins," have been used in Sanskrit medicine for many centuries.

Grapes and raisins, grown in extensive vineyards in Kabúl, are sold in the bazárs of Calcutta and Bombay and elsewhere, the former article in neat little baskets containing about 100 half-dried grapes. Two varieties of raisins are sold in the market, one large and purplish in colour, with seeds, called *Munakka*, and used in medicine; the other small, seedless, brownish in colour, called *Kishmish.*

Raisins (*Uvæ Passæ* of the B. P.) contain grape sugar, malic and other fruit acids, acid tartrate of potassium

(cream of tartar) and mucilage. The seeds contain a dense fixed oil or fat, and about 5 per cent. of tannic acid, which also exists in the skin of the fruit.

Medicinal uses.—Raisins have long been used in Native medicine as an ingredient in laxative, demulcent and expectorant medicines and of confections as a vehicle for unpleasant medicaments. Wine is made from grapes in Kashmír, but the wines used in medicine and pharmacy in India are imported.

WITHANIA COAGULANS.

VEGETABLE RENNET.

Vern.—*Beng.*—Ashvagandá; *Hind.*—Akri, Punir; *Bom.*—Kakanaj; *Tam.*—Amukkura; *Tel.*—Pennéru-gadda; *Pers.*—Panír-bad.

A small shrub of the natural order *Solanaceæ*, common in the Punjáb, Sind, Afghánistán and Belúchistan. The round, capsular FRUIT is used in the fresh state in these countries as an emetic and in small doses as a remedy in dyspepsia.

An application of more general interest, to which it is also commonly applied in North-Western India, is that of coagulating or curdling milk. A small portion is rubbed up with a little water or milk and added to the milk to be coagulated. The dried capsules have been found by Sir J. D. Hooker, from experiments conducted at Kew, to retain the coagulating property in an equal degree, a decoction made with one ounce of the powdered fruits to one quart of boiling [?] water, giving an excellent curd in about half an hour with one tablespoonful to one gallon of warm milk.

The active principle resides in the numerous small seeds contained within the capsules and is believed to be a

ferment closely allied to the rennet of the animal organism. It has been isolated and the name, *Withanin*, proposed for it. It is destroyed by boiling and is precipitated by alcohol, which latter does not however affect its coagulating property. A careful research by Mr. Sheridan Lea* has shown that it can be extracted from the seeds either by glycerin or by a moderately strong solution of common salt, extracts prepared by either means having strong coagulating powers even in small amounts.

It was found that these extracts could be preserved by means of common salt or alcohol, and that their activity was about equal to that of most commercial extracts of animal rennet, an important matter in certain parts of India where caste prejudice precludes the use of animal preparations.

WITHANIA SOMNIFERA.

Syn.—PHYSALIS FLEXUOSA : P. SOMNIFERA.

Vern.—*Beng.*—Asvagandhá ; *Hind.*—Asgandh ; *Sans.*—Asvagandha ; *Bom.*—Asgand.

A small shrub, common in Bombay and Western India, occasionally met with in Bengal, natural order *Solanaceæ*. The long, tapering, brittle, light-brown ROOT, white internally, has a peculiar pungent odour of horse's urine, which has given rise to vernacular names conveying this meaning. *Asgand* is a name also applied to the roots of *Ipomœa digitata* (q. v.), sold in Bombay. An alkaloid possessing hypnotic properties and named *Somniferine* has been isolated from the plant as grown in Southern Europe.

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* *Pharmaceutical Journal* (3) XIV, p. 606, quoting the *Proceedings* of the Royal Society, 1883.

The seeds have been found to possess the property of coagulating milk, like those of *W. coagulans*, but they also contain poisonous principles.

Medicinal uses.—The leaves and root are reputed to have narcotic properties; the latter is also considered diuretic and deobstruent. They are little known or used in Bengal.

WOODFORDIA FLORIBUNDA.

Vern.—*Beng.*—Dhái-phul; *Hind.*—Dhá, Dhaura; *Sans.*—Dhataki; *Bom.*—Dhayati; *Tel.*—Seringí.

A large shrub, of the natural order *Lythraceæ*, common in many parts of India.

The bright red flowers are used as a dye in Northern India, and are collected in the jungles in Bengal and elsewhere, and largely used as a tanning material. They contain a large quantity—about 20 per cent.—of tannic acid which circumstance accounts for their use as an astringent in Native medicine. They are employed in dysentery and other forms of hæmorrhage.

WRIGHTIA ANTIDYSENTERICA.

See HOLARRHENA ANTIDYSENTERICA.

ZANTHOXYLUM ALATUM.

Vern.—*Beng.*—Tambul; *Hind.*—Tejphal, Tumru; *Sans.*—Tumburu.

A shrub or bush common in the temperate Himálaya, in Bhutan and in the Khasia Hills, found also in the Darjíling district. Natural order *Rutaceæ*. The carpels of the fruits, which resemble those of coriander, yield an essential OIL, which has been investigated by Stenhouse and later by

Pedler and Warden. It is isomeric with turpentine and is somewhat similar to eucalyptus oil in odour and properties. The oil may be found to possess antiseptic, disinfectant and deodorant properties similar to those of eucalyptus.

The bark of this and several other species of the same genus contain berberine.

ZINGIBER OFFICINALE.

GINGER.

Vern.—The Root: *Beng.*—(Fresh)—Adrok, Adá. (Dried)—Sónt; *Hind.*—(Fresh)—Adrakh. (Dried)—Sonth; *Sans.*—Sringavéra; *Bom.*—(Fresh)—Alem. (Dried)—Sunta; *Tam.*—(Fresh)—Inji. (Dried)—Shukku; *Tel.*—(Fresh)—Allam. (Dried)—Sonti; *Arab.*—Zanjabíl.

Ginger has been cultivated in India and used as a spice and medicine for many centuries. The plant yielding it belongs to the natural order *Scitamineæ*, formerly called the *Zingiberaceæ*, or ginger order. It is now cultivated on a large scale in the warm, moist regions of India, chiefly in Madras, Cochin and Travancore, and to a somewhat less extent in Bengal and the Punjáb. The officinal portion is the dried RHIZOME, the ginger or ginger root of commerce. Cochin ginger is very largely exported from the port of that name and from Calicut and other places on the Malabar Coast, forming a considerable portion of the ginger supply of the world, and is reckoned in the London market as next in value to the more carefully prepared, and consequently better looking, Jamaica ginger. Bombay and Calcutta also export large quantities annually. The method commonly employed in India in the preparation of ginger for the market is crude and imperfect. The rhizomes having been dug up and washed, they are shaken

together in a rough basket, to remove more or less of the brown outer skin, and subsequently gradually dried in the sun. The better qualities are more carefully scraped, which considerably improves the appearance, and occasionally bleached.

Ginger is always easily obtainable, in the fresh or dried states in all the bazárs. The latter is commonly used as a condiment, and a conserve is made from the fresh younger rhizomes corresponding to the preserved "green ginger" exported from China.

The chemistry of ginger was fully investigated in 1880-2 by Mr. J. C. Thresh, B.Sc. He found Cochin ginger to contain 0·6 per cent. of *Gingerol*, the active principle, a straw-coloured, viscid, odourless fluid of extremely pungent taste; 1·4 per cent. of a pale yellow essential oil, with an aromatic but not pungent taste, to which the fragrant aroma of ginger is due: odour somewhat camphoraceous in bulk; besides resins and several other less characteristic constituents. It was also found that, in general, Jamaica ginger contains only about half the quantity of essential oil yielded by the Cochin although the former possesses a much finer fragrance.

"Gingerin" is a crude, liquid oleo-resin prepared from the root. It is usually extracted with ether, has the colour and consistence of treacle and retains the aromatic and pungent constituents of the drug. East Indian ginger yields abont 8 per cent., Jamaica ginger about 5 per cent.†

Medicinal uses.—In addition to numerous popular and domestic uses ginger root is much valued and largely used in medicine. It is aromatic, carminative and stimulant,

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* *Pharmaceutical Journal* (3), Vols. X & XII.

† *Year Book of Pharmacy*, 1892, p. 168.

useful in dyspepsia, flatulence and spasmodic affections of the stomach, and as a corrective adjunct to purgatives to prevent nausea and griping. The tincture and the stronger tincture are the most important official preparations. Gingerin is a convenient form for addition to pills.

ZIZYPHUS JUJUBA.

THE JUJUBE FRUIT.

Vern.—*Beng.*—Bér, Kúl; *Hind.*—Bér; *Sans.*—Badarí; *Bom.*—Bor; *Tam.*—Elandap; *Tel.*—Régu; *Pers.*—Kunár.

A small or moderate sized tree found wild and cultivated in many parts of India and in Burma. Natural order *Rhamneæ.* The fruit of the wild variety is not unlike a crab-apple in appearance and taste, palatable, very acid and astringent. It is eaten raw and also preserved by drying. The fruits of the cultivated varieties are more palatable and less acid. The jujube fruit sold in the market is imported from China, probably also from Nepal, and is believed to be the product of *Z. vulgaris.*

The FRUIT contains mucilage and sugar, in addition to fruit acids. The bark contains much tannin (named *Ziziphotannic Acid*) and a crystallizable principle, *Ziziphic Acid,* has been isolated from a watery extract of the wood.

Medicinal uses.—The bark is said to be used in some localities as a simple remedy in diarrhœa and as a domestic application in cases where an astringent is indicated.

APPENDICES.

I.

ACONITUM NAPELLUS.

THE chemistry of the aconite alkaloids having been the subject of several recent researches, concluded since the earlier portions of this book had been printed, a brief *résumé* is presented.

Professor Wyndham R. Dunstan, in conjunction with Messrs. E. F. Harrison, F. H. Carr, and H. A. D. Jowett, has determined that "pure crystalline *Aconitine*, a highly toxic base of definite and invariable composition, and capable of producing constant therapeutic effects, is associated in *Aconitum Napellus* with at least three amorphous and much less poisonous alkaloids, *viz.*, *Aconine*, *Isaconitine* and *Homoisaconitine*, which constitute at least 75 per cent. of the total bases, and occur likewise to a very large extent in many commercial specimens of aconitine. It is therefore considered most important that in future none but the pure *crystalline* base should be used in medicine. Two of the amorphous alkaloids, aconine and isaconitine, have been isolated in a pure condition and their properties and composition investigated. Isaconitine, which is regarded as a new base, entirely different from the variable mixture of amorphous alkaloids, described by earlier workers under the name of napelline, is found to occur in aconite root to as large an extent as aconitine, and to be the chief base present in the aconitine salts of commerce. While differing essentially from aconitine in chemical constitution and physiological activity, it proves to be isomeric with the latter base, to be readily obtainable from it, and to agree with it in yielding aconine and benzoic acid on hydrolysis." (*Year Book of Pharmacy*, 1893.)

The determination of the composition of pure aconitine, based on the hydrolytic conversion of aconitine into aconine and benzoic acid has been the subject of further important research.

The isaconitine above described has been discovered by Dunstan to be identical with the amorphous alkaloid previously described by T. B. Groves and C. R. A. Wright under the name of picraconitine. "It further appears that the conversion of aconitine into isaconitine invariably precedes the hydrolysis of the former into aconine and benzoic acid, that this conversion is always accompanied by the formation of a definite and constant proportion of acetic acid, and that aconitine must therefore be regarded as acetyl-benzoyl-aconine, and isaconitine (picraconitine) as benzoyl-aconine. It has further been observed that when aconitine is heated at its melting-point it is decomposed into acetic acid and *Pyraconitine* (anhydro-benzoyl-aconine), a new base which yields on hydrolysis benzoic acid and *Pyraconine* (anhydro-aconine) and agrees with isaconitine in being non-poisonous. The formation from aconitine of a constant quantity of acetic acid on heating or by hydrolysis, promises to serve as the basis of a satisfactory process for the assay and standardization of galenical preparations of aconite."

"The identity of isaconitine and Groves and Wright's picraconitine, as well as the formation of this body along with acetic acid in the first stage of the action of boiling water on aconitine, have also been observed, independently of W. R. Dunstan and his collaborators, and practically at the same time, by M. Freund and P. Beck." (*Year Book of Pharmacy*, 1894) The question of priority has been the subject of controversy: in the latest contribution* to the subject M. Freund establishes the independence of his own work and maintains that the analytical results of Beck and himself, which were very extensive, are not only different from Dunstan's, but show that the chemical formulæ assigned to aconitine and aconine by the latter investigator are incorrect.

A research into the chemical constitution of the alkaloids of *Aconitum Napellus* and *A. ferox*, as grown in the Himálaya, is understood to be in progress (1896) at the Research Laboratory of the Pharmaceutical Society.

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* Translation from the *Berichte* in the *British and Colonial Druggist*, 22nd November 1895.

ACONITE COLLECTION IN THE HIMALAYA.

The following extract, from an official report (1895), indicates the nature of drug-collecting at high altitudes in Northern India, and accounts in some measure for the fact that aconite root as commonly sold in the bazárs is extremely variable in character and consists of a mixture of the roots of several species of aconite, while the cost to the purchaser usually exceeds that of the imported drug.

"Aconite is collected by Sirba Bhutias dwelling in the Darjíling district, and occasionally making a journey to their native country, Bhutan. It is to be found growing at an elevation of ten thousand feet above the sea-level, and among other places on the Singalilas, a mountain range which is the watershed boundary between Nepal and British territory North-West of Darjíling. Here two species of aconite, *Aconitum palmatum* and *A. Napellus* or *Nepalus*, grow freely.

"*Aconitum palmatum* is collected in abundance at Tonglu, the southern termination of the Singalilas; but *Napellus*, the more poisonous variety, requires a higher elevation in which to thrive. It takes kindly to the bleak, rugged crags of Sundakphu (12,929 feet), and is to be found under the rhododendron covers and cold shady watercourses. It seldom grows taller than three feet, a single stock with blue flowers springing from each bulb or root. The Natives, especially the hill-tribes, take aconite in its crude state as a remedy for various ailments, and every Bhutia has a few dried roots put away in some secure corner of his hut.

"Early in October, when the aconite root has matured, one of the leading men in the village organises a party comprised of both sexes. He for the time being becomes their leader, settles all disputes and quarrels while out in camp, and while keeping an account of the general expenses, supplies to each the daily requirements in the way of food. His first step is to take out a 'permit' from the Forest Department, which costs fifteen rupees. (If the party is proceeding to the Nepal hills, no permit is required, but a toll is charged at each station on every load). He wraps the pass up in a rag, and places it in his network bag of valuables, collects his band together, and sets out for the higher ranges. They travel as lightly as possible, each carrying a *thumsi*, or large bamboo basket, which contains a brass pot for cooking, a flat iron spoon to help out the rice, with a sufficient quantity of rice and vegetables to last five or six days. They also carry a thick Bhutia blanket, with the indispensable *kukrí*, or hatchet-knife

fastened through the waistband. A strong sapling serves as a walking-stick and as a support for the basket, which is not unstrapped from the back until a halt is made. When tired, they relieve themselves by balancing their load on the stick.

"The first stoppage in their march is generally made near a running stream, when they remove the burdens off their backs and light a fire or two of brushwood by the aid of flint and steel carried in the sheaths of their *kukris*. They do not drain the water off the rice, as is generally done, but eat it in a moist mass on big leaves fetched out of the jungle, with vegetables fried in oil, and an amazing number of hot chillies. One hour sees them through their meal and ready to continue their march again. When evening comes on they make a second halt in some desirable place to spend the night, where they knock up temporary shelters made of bamboos, to keep off the night-dew, squat round the fires they have lighted, crack jokes, and relate adventures they have met with. The headman, who is usually the centre of attraction, has a fund of stories at his command. Or if a Lama (priest)—as is not unfrequently the case—is the leader of the party, he gives extracts out of their religious writings. It is an interesting sight to see him perched on a raised bit of ground, with his followers lying round him in all postures, gazing with rapt attention while he gives episodes out of their sacred books. The Bhutias are of the Buddhist religion, and own as their spiritual head the Great Lama of Thibet, but the Buddhism to which they adhere is much interwoven with demon-worship.

"As night advances, and the party think it is time to retire, they disappear within their bamboo shelters, taking the precaution to put their *kukris* under their heads, in case of a night attack from the robber tribes who hover about the frontier. Some of the hardier of the Sirbas sleep in the open air, with a blanket about them, heedless of the cutting wind and thermometer at zero. They are generally followed by a big Thibetan dog, a fierce-looking animal resembling a bear, with large blue eyes. He sleeps during the day, and keeps watch at night, giving low growls every now and again.

"As soon as the party has arrived at the slopes where aconite is plentiful, they build bamboo huts about five feet high, with leaves for the roofs, and make the place generally habitable. After their morning meal, each shoulders his basket, and takes a spade, for which a handle has been made from a jungle sapling. They start for the slopes lower down, leaving the dog and one of the company behind in charge of the camp. Before beginning operations, a ceremony has to be performed.

"The Nepalese seldom take up the trade of aconite collecting, as they have a superstition that the presiding demon of the hills imprisons evil spirits in this plant, which fly out as soon as it is dug up, and inflict dire calamity on the digger. Bhutias have this superstition also, with a remedy. They always have in their party a destroyer of these spirits; and every morning before digging, the Lama, standing on a convenient hill with his crowd round him, makes a fire and burns some *dhuna*, a sort of resin, then putting two fingers in his mouth, he gives several shrill whistles. All wait in breathless silence till an answering whistle is heard, an echo, the cry of a bird —pheasant as a rule from the gorge below, or the soughing of the wind among the pines—which they take as the dying dirge of the spirits.

"Thus satisfied, they commence the digging, shake out the mud, and throw the roots into the basket. By evening you can see them climbing up the hillsides from various directions, making for the encampment, where they empty out the contents of their baskets in heaps, and cover them with bamboo leaves, to keep out the heavy frost of the night. The collectors work in couples, and during the day the roots are spread out to dry in the sun. When a sufficient quantity is collected and dried, bamboo frames are made, with a fire below, on which the aconite is placed when the flame has died out. Three to four days over this artificial heat dries up the root. While the firing process is going on, the man attending to it has a cloth tied round his head, covering his nose, as it is injurious to inhale the fumes. It causes a feeling of heaviness, followed by symptoms not unlike intoxication.

"While the aconite is drying, the collectors fill in all their time snaring pheasants, which come to the open country to feed, trapping musk deer, which are plentiful on the Singalilas, and shooting various other kinds of game to supply their immediate wants. The live pheasants and deer they put into bamboo baskets, and bring into the stations for sale.

"The whole trip generally lasts a month, and when sufficient aconite has been collected and dried, the roots are packed in baskets, with other goods and chattels on the top, which make a very decent load, varying from one hundred and twenty to two hundred pounds. Sirba women are as sturdy as the men, and it not unfrequently happens that their loads are heavier than those of the so-called stronger sex. When all are ready, they shoulder their baskets and start off at a brisk pace, walking one behind the other, from a distance

looking not unlike a huge serpent winding along the hill-path. Keeping step they move so rapidly that it is difficult for others unaccustomed to hill-climbing to keep up with these hardy mountaineers. To one who understands their language, it is by no means dull work walking with them, as they are a jolly crowd, laughing, chatting, and relating stories in their graphic Oriental manner—the sum and substance first, then the narrative *in extenso*, not leaving out the most minute detail.

"Arriving at the commercial centre at the termination of their march the goods are disposed of, and each man receives his share of the profits according to the amount of aconite he has collected. They then make their purchases for the winter, besides vegetable and other seeds for the coming season, and once more settle down to their quiet village life, to attend to the cultivation of potatoes, Indian corn, bringaels (or brinjals, the fruit of the egg plant), and cardamom."

II.

AILANTHUS EXCELSA.

Mr. David Hooper, F.L.S., has recently re-examined the bark of *Ailanthus excelsa*. (*Pharm. Journal* (IV) 1322, 26th Oct., 1895.) He finds that the bitter principle, formerly believed to be ailantic acid (page 15) has no claim to be considered an acid, but rather to belong to a neutral class of substances related to quassiin. The fluorescence of its solutions, the abundant precipitate it gives with tannin, and the purplish colour it communicates to strong sulphuric acid are characteristic of the bitter principles of many plants of the *Simarubaceæ*, and Hooper believes that "the cedrin obtained by Lewy in the seeds of *Simaba cedron*, the principles separated byWarden from the wood of *Picrasma quassioides*, and by Shimojama and Hirano from *P. ailanthoides*, and the samaderin from *Samadera indica* may, on more complete analysis, prove to be one and the same active principle, and that principle, quassiin."

III.

FLUID EXTRACTS

OF INDIAN INDIGENOUS DRUGS.

In the prefatory portion of this book the suggestion has been made that the form of pharmaceutical preparation best suited for the exhibition of many of the medicinal products enumerated in these pages, which it may be desirable to put to more extended use, is the general one of FLUID EXTRACTS.

They are official in the *Pharmacopœia of the United States* and very popular in America, where they were originated, and where their manufacture is carried to great perfection by pharmaceutical specialists. Several "liquid extracts" are official in the *British Pharmacopœia.*

Fluid extracts are defined by Professor Remington* as "liquid alcoholic preparations of uniform and definite strength, made by percolating drugs with menstrua, and concentrating a portion of the percolate, so that in each case a cubic centimetre represents the medicinal virtues of one gramme of the drug†: they are mostly concentrated tinctures." Alcohol, of various strengths, is used exclusively as the extractive and preservative medium. The advantages possessed by this class of preparation have already been cited. Various methods of manufacture are adopted in practice, and various modifications even of official formulæ, according to the treatment best suited by experience to each individual drug. Although the preparation of such products comes essentially within the domain of the practical pharmacist, a description of the principal processes involved, and of the preparation of a typical fluid extract are appended, together with a brief enumeration of the more important drugs according to the menstruum best suited for their extraction, in order that their experimental preparation and therapeutical trial may be encouraged, specially in charitable dispensary practice in India.

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* "*Practice of Pharmacy.*"

† [Approximately one fluid ounce represents one ounce of the original drug: one part by measure is made from one part by weight.]

The process of "percolation" or displacement, official in the *United States Pharmacopœia*, 1890, is well described in that volume as follows :—

"It consists in subjecting a substance or a mixture of substances, in powder, contained in a vessel called a percolator, to the solvent action of successive portions of a certain menstruum in such a manner, that the liquid as it traverses the powder in its descent to the receiver, shall be charged with the soluble portion of it, and pass from the percolator free from insoluble matter.

"When the process is successfully conducted, the first portion of the liquid, or percolate, passing through the percolator, will be nearly saturated with the soluble constituents of the substance treated ; and if the quantity of menstruum be sufficient for its exhaustion, the last portion of the percolate will be nearly free from colour, odour and taste, other than those of the menstruum itself.

"The percolator should be nearly cylindrical or slightly conical, with a funnel-shaped termination at the smaller end [capacity about 1 litre or $1\frac{3}{4}$ (1·76077) pint]. The neck of the funnel-end should be rather short and should gradually and regularly become narrower towards the orifice, so that a perforated cork, bearing a short glass tube, may be tightly wedged into it from within until the end of the cork is flush with the outer edge of the orifice. The glass tube, which must not project above the inner surface of the cork, should extend 3 to 4 centimetres [about 1 inch] beyond the outer surface of the cork [and should be provided with an arrangement for opening and closing, such as a tube and pinchcock]. * * * The shape of the percolator should be adapted to the nature of the drug to be operated upon. For drugs which are apt to swell, particularly when a feebly alcoholic or an aqueous menstruum is employed, a *conical* percolator is preferable. A *cylindrical* or only slightly tapering percolator may be used for drugs which are not liable to swell, and when the menstruum is strongly alcoholic, or when ether or some other volatile liquid is used for extraction. The size of the percolator should be in proportion to the quantity of drug extracted. When properly packed in the percolator, the drug should not occupy more than two-thirds of its height. The percolator is best constructed of glass or stone-ware, but, unless otherwise directed, may be made of any suitable material not affected by the drug or menstruum.

"The percolator is prepared for percolation by gently pressing a small tuft of cotton into the neck above the cork, a thin layer of clean and dry sand [or powdered glass] being then poured upon the surface of the cotton to hold it in its place.

"The powdered substance to be percolated (which must be of uniform fineness and should be perfectly air-dry before it is weighed) is put into a basin, the specified quantity of menstruum is poured on, and it is thoroughly stirred with a spatula, or other suitable instrument until it appears uniformly moistened. The moist powder may be passed through a coarse sieve and is now transferred to a sheet of thick paper and the whole quantity poured from this into the percolator. It is then shaken down lightly, and allowed to remain in that condition for a period varying from fifteen minutes to several hours, unless otherwise directed ; after which the powder is pressed, by the aid of a plunger of suitable dimensions, more or less firmly, in proportion to the character of the powdered substance and the alcoholic strength of the menstruum ; strongly alcoholic menstrua, as a rule, permitting firmer packing of the powder than the weaker. The percolator is now placed in position for percolation, and the surface of the powder covered by an accurately fitting disk of filtering paper, or other suitable material, and a sufficient quantity of the menstruum poured on through a funnel reaching nearly to the surface of the paper. If these conditions be accurately observed, the menstruum will penetrate the powder equally : the percolator is now closely covered to prevent evaporation. The apparatus is then allowed to stand at rest for the time specified in the formula [usually for forty-eight hours]."

The following typical formula from the *United States Pharmacopœia* will illustrate the preparation of a fluid extract :—

EXTRACTUM CHIRATÆ FLUIDUM.

Fluid Extract of Chirata.

Chirata, in No. 30 powder,* *one thousand grammes* ... 1,000 Gm.
Alcohol,
Water, each, *a sufficient quantity.*

To make *one thousand cubic centimeters* ... 1,000 Cc.

Mix *six hundred* (600) *cubic centimeters* of Alcohol with *three hundred* (300) *cubic centimeters* of Water, and, having moistened the powder with *three hundred and fifty* (350) *cubic centimeters* of the mixture, pack it firmly in a cylindrical percolator, then add enough

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* [A moderately coarse powder, which should pass through a sieve having 3 meshes to the linear inch.]

menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding menstruum, using the same proportions of Alcohol and Water as before, until the Chirata is exhausted. Reserve the first *eight hundred and fifty* (850) *cubic centimeters* of the percolate. Distil off the Alcohol from the remainder by means of a water-bath, and evaporate the residue to a soft extract,* dissolve this in the reserved portion, and add enough menstruum to make the Fluid Extract measure *one thousand* (1,000) *cubic centimeters.*

A simple percolator for small experimental quantities of a few ounces may be made from an inverted conical flask or champagne bottle from which the bottom portion has been cut away.

The process of "repercolation" is an improvement on the method above described, because the drug is percolated to exhaustion and evaporation obviated by storing away the weak percolate until the next operation upon the same drug, when it is used in place of fresh menstruum. It is defined by its author, Dr. E. R. Squibb, as "the successive application of the same percolating menstruum to fresh portions of the substance to be percolated." (Remington's *Practice of Pharmacy.*) The process also obviates the use of heat and possible loss of volatile constituents. Repercolation and expression is the process generally followed on the large scale in America.

Processes have been devised for the *assay* of fluid extracts containing powerful active principles. Standardised fluid extract of nux-vomica is official in the *United States Pharmacopœia*, 1890, and among others for which assay methods have been proposed are aconite root and belladonna leaves and root (based on alkaloidal yield); cannabis indica (10 per cent. resinous principles, soluble in chloroform); cinchona and henbane (alkaloidal); jalap (12 per cent. of resin); podophyllum (yield of podophyllotoxin); stramonium leaves and seeds (total alkaloid reckoned as daturine).

The following table indicates the menstruum suggested for the preparation of fluid extracts of some Indian indigenous drugs, and includes those at present official.

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* [Heat is thus applied only to a small proportion relatively, about 1-10th part of the finished product.]

FLUID EXTRACTS

Arranged in classes, according to the alcoholic strength of their menstrua.

The articles printed in heavier-faced type are official in the *United States Pharmacopœia*, where full working formulæ are given.

ALCOHOL.*

Calamus
Cannabis Indica
Capsicum
Cimicifuga.
Cubeb.
Ginger.
Kala-dana.
Indian Jalap (root-bark).
Sandal-wood.

ALCOHOL ... 4 WATER ... 1

Babchí.
Belladonna (root).
Chamomile.
Costus.
Podophyllum.
Rhubarb.
Ptychotis.

ALCOHOL ... 3 WATER ... 1

Aconite (root).
Antamul (root-bark).
Calumba.
Indian Valerian.
Ipecacuanha.
Jatamansi.
Naregamia.

ALCOHOL ... 2 WATER ...

Betel (leaves).
Bitter-orange peel.
Castor (leaves).
Chirata.
Colchicum (Hermodactyl).
Hyoscyamus.
Phyllanthus Niruri.

DILUTED ALCOHOL.†

Acalypha indica (leaves).
Coca.
Dulcamara.
Dita (bark).
Indian Gentian.
Picrorhiza Kurooa.
Senna.
Taraxacum.

WATER ... 2 ALCOHOL ... 1

Abroma augusta (root-bark).
Adhatoda Vasica.
Ailanthus excelsa (bark).
Asok (bark).
Bael (fresh unripe fruit).
China root.
Euphorbia pilulifera.
Hemidesmus.
Hydrocotyle asiatica.
Jambul.
Jute (leaves).
Kreat.
Kurchí.
Lodh (bark).
Mangosteen (rind).
Picrasma quassioides.
Pomegranate (rind).
Samadera (wood).
Sarsaparilla.

* Consisting of about 91 per cent., by weight, of Ethyl alcohol, and about 9 per cent., by weight, of water.

† Diluted alcohol, U. S. P., corresponding to Proof Spirit B.P.: 500 c. c. alcohol mixed with 500 c. c. distilled water, at 15·6° C. (60° F.) measure when cooled to the same temperature, about 971 c. c.

ALCOHOL ... 3
AMMONIA WATER ... 0·5
WATER ... 6·5

Liquorice.
Abrus precatorius (leaves or root).

ALCOHOL ... 3
WATER ... 1
ACETIC ACID 0·5

Nux-vomica.*

ALCOHOL ... 4
GLYCERINE 1
Subsequently,
ALCOHOL ... 4
WATER ... 1

Cinchona.

GLYCERINE 3
WATER ... 5
ALCOHOL ... 2

Cotton-root bark.
Gokhru (chhota).
,, (bara).

Gulancha (herb).
Indian Barberry.
Mishmi Teeta.
Nim (bark).
Pericampylus (root).†
Pomegranate (fresh root-bark).
Siegesbeckia orientalis.

GLYCERINE 1
ALCOHOL ... 9

Nut-galls.
Myrobalans.
Pistachio nut.

Posology.

General adult dose of the above preparations:—5 to 30 minims; with the following exceptions:—

Aconite. Belladonna. Cannabis Indica. Cimicifuga. Colchicum. *Hydrocotyle asiatica.* Nux-vomica. Stramonium.	1 to 5 minims.
Pomegranate (root-bark). Gokhru.	½ to 1 fluid ounce.

While the above safe limit of dosage has been indicated, and the therapeutics of all important indigenous drugs given in the text, no attempt has been made to attach arbitrary statements of doses of individual medicines as suited to particular requirements. This is best learned from actual practice and trial with small quantities, judiciously increased where desirable.

* Standardised to 1·5 per cent. of total alkaloids.

† For Hypodermic Injection: *see* page 232.

IV.

FOODS OF INDIA.

The following table, prepared by the author from an extensive series of experiments conducted by him some years ago, gives the average percentage composition and comparative value of the most important dietetic articles used in India, some of which have been incidentally referred to in the preceding pages :—

Articles of Food.	Popular and Vernacular Names.	Scientific Names.	Average percentage.			
			Flesh-formers.*	Heat givers.†	Mineral matters‡	Watery matters.
		Amylaceous.				
Rice ...	*Chal* ...	Oryza sativa ...	7	78	1	14
Arrow-root ...	*Ararut* ...	Maranta arundinacea	4	82	1	13
Sago ...	*Sagu* ...	Sagus lævis ...				
Water-Caltrop...	*Pani-phul* ...	Trapa bispinosa§ ...				
Potato ...	*Alu* ...	Solanum tuberosum ...	2	23	1	74
		Saccharine.				
Sugar ...	*Chini* ...	Saccharum officinarum	0	100	0	0
		Oleaginous.				
Butter ...	*Ghee* ...	Butyrum ...	0	100	0	0
		Fibrinous and Albuminous.				
Wheat ...	*Gam* ...	Triticum vulgare ...	13	72	2	13
Maize ...	*Janar* ...	Zea mays ...	9	75	2	14
Great Millet ...	*Jawari* ...	Sorghum vulgare ...	9	74	1	16
Spiked Millet ...	*Bajra* ...	Penicillaria spicata ...	10	73	2	15
Little Millet ...	*Kangni* ...	Panicum miliaceum ...	12	70	1	17
Oats ...	*Jai* ...	Avena sativa ...	11	69	3	17
Barley ...	*Jab* ...	Hordeum hexastichum	11	72	2	15
Fish ...	*Mach* ...	Piscis ...	14	7	1	78
Meat ...	*Mangsha* ...	Carnis ...	22	14	1	63
		Caseinous.				
Gram ...	*Chhollar Dal* ...	Cicer arietinum ...	19	62	3	16
Pigeon Pea ...	*Arahar Dal* ...	Cajanus indicus ...	20	61	3	16
Common Pea ...	*Matar Dal* ...	Pisum sativum ...	25	58	2	15
Lentils ...	*Musur Dal* ...	Ervum lens ...	24	59	2	15
Vetch ...	*Khesarî Dal* ...	Lathyrus sativus ...	28	56	3	13
Choulí ...	*Barbati Dal* ...	Dolichos sinensis ...	24	59	3	14
Green Gram ...	*Mug Dal* ...	Phaseolus mungo ...	24	60	3	13
Phaseol ...	*Mash Kulaya Dal*	Phaseolus radiatus ...	22	62	3	13
Green Peas ...	*Karie Suti* ...	Pisum sativum ..	7	36	2	55
Milk ...	*Dudh* ...	Lactis ...	5	8	1	86

* † ‡ *See* next page. § *See* page 320.

* Flesh-formers are *nitrogenous* matters which supply nutriment and form the tissues of the body. The nutritive or flesh-forming parts of a food are called *fibrin*, *albumen* and *casein :* they contain the four elements,—*carbon*, *hydrogen*, *nitrogen*, and *oxygen*,—in exactly the same proportions, and are found both in vegetable and animal food. Fibrin may be got either by stirring fresh-drawn blood, or from the juice of a cauliflower ; albumen, or white of egg, from eggs, from cabbage juice, or from flour : casein or cheese exists more abundantly in peas and beans, than it does in milk itself. Both the animal and vegetable casein puts a great strain on the digestive functions to convert it into fibrin and albumen. Vegetables are the true makers of flesh.

† Heat-givers, or *carbonaceous* food, consist of starchy, saccharine, and oleaginous matters, which supply fat and heat to the animal system.

‡ Mineral matters supply the various salts which enter into the composition of the blood and tissues. These salts are iron, phosphate of lime and potash, carbonate of lime, fluoride of calcium, phosphate of magnesium, chloride of sodium and potassium, sulphates, silica, and manganese.

BOTANICAL CLASSIFICATION
IN
NATURAL ORDERS
OF
PLANTS ENUMERATED IN THIS WORK.

After the "*Flora of British India.*"

I.—RANUNCULACEÆ.

Thalictrum foliolosum, *DC.*
Coptis Teeta, *Wall.*
Delphinium denudatum, *Wall.*
Aconitum ferox, *Wall.*
„ heterophyllum, *Wall.*
„ Napellus, *Linn.*
Actæa spicata, *Linn.*
Pæonia emodi, *Wall.*

II.—DILLENIACEÆ.

Dillenia indica, *Linn.*

III.—MAGNOLIACEÆ.

Michelia Champaca, *Linn.*

IV.—ANONACEÆ.

Cananga odorata, *Hook. fil.*
Anona squamosa, *Linn.*

V.—MENISPERMACEÆ.

Tinospora cordifolia, *Miers.*
Anamirta Cocculus, *W. & A.*
Coscinium fenestratum, *Colebrooke.*
Cocculus villosus, *DC.*
Pericampylus incanus, *Miers.*
Cissampelos Pareira, *Linn.*

VI.—BERBERIDEÆ.

Berberis aristata, *DC.*
„ Lycium, *Royle.*
„ asiatica, *Roxb.*
Podophyllum emodi, *Wall.*

VII.—NYMPHÆACEÆ.

Nymphæa Lotus, *Linn.*
Euryale ferox, *Salisb.*
Nelumbium speciosum, *Willd.*

VIII.—PAPAVERACEÆ.

Papaver Rhœas, *Linn.*
„ somniferum, *Linn.*
Argemone mexicana, *Linn.*

IX.—FUMARIACEÆ.

Hypecoum procumbens, *Linn.*
Corydalis Govaniana, *Wall.*
Fumaria officinalis (parviflora) *Lamk.*

X.—CRUCIFERÆ.

Brassica nigra, *Koch.*
„ campestris, *Linn.*
„ juncea, *Hook. fil.*
Capsella Bursa-pastoris, *Mœnch.*
Lepidium sativum, *Linn.*
Raphanus sativus, *Linn.*

XI.—Capparideæ.

Cleome viscosa, *Linn.*
Gynandropsis pentaphylla, *DC.*
Mærua arenaria, *H. F. & T.*
Cratæva religiosa, *Forst.*
Capparis spinosa, *Linn.*
„ aphylla, *Roth.*

XIII.—Violaceæ.

Viola odorata, *Linn.*
Ionidum suffruticosum, *Ging.*

XIV.—Bixineæ.

Bixa Orellana, *Linn.*
Gynocardia odorata, *R. Br.*

XX.—Tamariscineæ.

Tamarix gallica, *Linn.*

XXIII.—Guttiferæ.

Garcinia Mangostana, *Linn.*
„ indica, *Chois.*
„ Morella, *Desrouss*
Mesua ferrea, *Linn.*

XXIV.—Ternstrœmiaceæ.

Camellia theifera, *Griff.*

XXV.—Dipterocarpeæ.

Dipterocarpus turbinatus, *Gœrtn.*
Shorea robusta, *Gœrtn.*
Hopea odorata, *Roxb.*
Vateria indica, *Linn.*

XXVI.—Malvaceæ.

Althæa officinalis, *Linn.*
Malva sylvestris, *Linn.*
Sida cordifolia, *Linn.*
Pavonia odorata, *Willd.*
Hibiscus Sabdariffa, *Linn.*
„ Abelmoschus, *Linn.*
„ esculentus, *Linn.*
„ Rosa-sinensis, *Linn.*
Gossypium herbaceum, *Linn.*
Adansonia digitata, *Linn.*
Bombax malabaricum, *DC.*

XXVII.—Sterculiaceæ.

Helicteres Isora, *Linn.*
Abroma augusta, *Linn.*
Cola acuminata, *R. Br.*

XXVIII.—Tiliaceæ.

Grewia asiatica, *Linn.*
Corchorus capsularis, *Linn.*
„ olitorius, *Linn.*

XXIX.—Lineæ.

Linum usitatissimum, *Linn.*
Erythroxylon Coca, *Lam.*
Erythroxylon monogynum, *Roxb.*

XXXI.—Zygophylleæ.

Tribulus terrestris, *Linn.*

XXXII.—Geraniaceæ.

Geranium Robertianum, *Linn.*
Oxalis corniculata, *Linn.*
Impatiens sulcata, *Wall.*

XXXIII.—Rutaceæ.

Ruta graveolens, *Linn.*
Peganum Harmala, *Linn.*
Toddalia aculeata, *Pers.*
Citrus medica, *Linn.*
„ Aurantium, *Linn.*
Feronia elephantum, *Correa.*
Ægle Marmelos, *Correa.*

XXXIV.—Simarubeæ.

Ailanthus excelsa, *Roxb.*
Samadera indica, *Gaertn.*
Picrasma quassioides, *Benn.*

XXXVI.—Burseraceæ.

Boswellia serrata, *Roxb.*
Garuga pinnata, *Roxb.*
Balsamodendron Mukul, *Hook.*
„ Myrrha, *Nees.*
Canarium commune, *Linn.*

XXXVII.—Meliaceæ.

Naregamia alata, *W. & A.*
Melia Azadirachta, *Linn.*
„ Azedarach, *Linn.*
Amoora Rohituka, *W. & A.*
Carapa moluccensis, *Lam.*
Soymida febrifuga, *Adr. Juss.*

XLI.—Celastrineæ.

Celastrus paniculata, *Willd.*

XLII.—Rhamneæ.

Zizyphus Jujuba, *Lamk.*

XLIII.—Ampelideæ.

Vitis vinifera, *Linn.*

XLIV.—Sapindaceæ.

Cardiospermum Halicacabum, *Linn.*
Schleichera trijuga, *Willd.*
Sapindus trifoliatus, *Linn.*

XLVI.—Anacardiaceæ.

Pistacia integerrima, *Stewart.*
„ lentiscus, *Linn.*
„ Terebinthus, *Linn.*
„ vera, *Linn.*
Mangifera indica, *Linn.*
Anacardium occidentale, *Linn.*
Melanorrhœa usitata, *Wall.*
Semecarpus Anacardium, *Linn.*
Holigarna longifolia, *Roxb.*

XLVIII.—Moringeæ.

Moringa pterygosperma, *Gærtn.*

L.—Leguminosæ.

Trigonella Fœnum-græcum, *Linn.*
Melilotus officinalis, *Willd.*
Indigofera tinctoria, *Linn.*
Psoralea corylifolia, *Linn.*
Sesbania ægyptiaca, *Pers.*
„ grandiflora, *Pers.*
Astralagus verus (bicuspis., *Fisch*).
Alhagi maurorum, *Desv.*
Æschynomene aspera, *Linn.*
Desmodium gangeticum, *DC.*
Abrus precatorius, *Linn.*
Lens esculenta, *Linn.*
Lathyrus sativus, *Linn.*
Mucuna pruriens, *DC.*
Erythrina indica, *Linn.*
Butea frondosa, *Roxb.*
Clitoria ternatea, *Linn.*
Dolichos biflorus, *Linn.*
Pterocarpus Marsupium, *Roxb.*
„ santalinus, *Linn.*
Pongamia glabra, *Vent.*
Cæsalpinia Bonducella, *Fleming.*
„ Sappan, *Linn.*
Cassia Fistula, *Linn.*
„ occidentalis, *Linn.*
„ sophera, *Linn.*
„ Tora, *Linn.*
„ obovata, *Collad.*
„ alata, *Linn.*
„ angustifolia, *Vahl.*
Hardwickia pinnata, *Roxb.*
Saraca indica, *Linn.*
Tamarindus indica, *Linn.*
Bauhinia variegata, *Linn.*
Entada scandens, *Benth.*
Mimosa pudica, *Linn.*
Adenanthera pavonina, *Linn.*
Acacia Farnesiana, *Willd.*
„ arabica, *Willd.*
„ Catechu, *Willd.*
Glycyrrhiza glabra, *Boiss.*

LI.—Rosaceæ.

Prunus Amygdalus, *Linn.*
„ communis, *Huds.*
Agrimonia Eupatorium, *Linn.*
Rosa damascena, *Mill.*
„ centifolia, *Linn.*
Cydonia vulgaris, *Pers.*

LIII.—Crassulaceæ.

Bryophyllum calycinum, *Salisb.*
Kalanchœ laciniata, *DC.*

LIV.—Droseraceæ.

Drosera Burmanni, *Vahl.*
„ peltata, *Sm.*

LV.—Hamamelideæ.

Liquidambar orientalis. *Miller.*
Altingia excelsa, *Noronha.*

LVIII.—Combretaceæ.

Terminalia Catappa, *Linn.*
„ belerica, *Roxb.*
„ Chebula, *Retz.*
„ Arjuna, *Bedd.*

LIX.—Myrtaceæ.

Melaleuca Leucadendron, *Linn.*
Psidium Guyava, *Linn.*
Eugenia Jambolana, *Lam.*
Barringtonia acutangula, *Gaertn.*
Careya arborea, *Roxb.*
Caryophyllus aromaticus, *Linn.*
Eucalyptus globulus, *Labill.*
Myrtus communis, *Linn.*

LXI.—Lythraceæ.

Ammania baccifera, *Linn.*
Woodfordia floribunda, *Salisb.*
Lawsonia alba, *Lamk.*
Punica Granatum, *Linn.*

LXII.—Onagraceæ.

Trapa bispinosa, *Roxb.*

LXIV.—Passifloreæ.

Carica Papaya, *Linn.*

LXV.—Cucurbitaceæ.

Trichosanthes dioica, *Roxb.*
Lagenaria vulgaris, *Seringe.*
Luffa acutangula, *Roxb.*
Benincasa cerifera, *Savi.*
Momordica Charantia, *Linn.*
Cucumis Melo, *Linn.*
„ sativus, *Linn.*
Citrullus Colcynthis, *Schrod.*
„ vulgaris, *Schrod.*
Cephalandra indica, *Naud.*
Cucurbita Pepo, *DC.*
Bryonia laciniosa, *Linn.*
Corallocarpus epigæa, *Hook. fil.*

LXVIII.—Cacteæ.

Opuntia Dillenii, *Haw.*

LXX.—Umbelliferæ.

Hydrocotyle asiatica, *Linn.*
Apium graveolens, *Linn.*
Carum Carui, *Linn.*
„ copticum, *Benth.*
Pimpinella Anisum. *Boiss.*
Fœniculum vulgare. *Gaertn.*
Ferula Narthex, *Boiss.*
„ alliacea, *Boiss.*
„ fœtida, *Rœhl.*
„ galbaniflua, *Boiss.*
Peucedanum graveolens, *Benth.*
Coriandrum sativum, *Linn.*
Cuminum Cyminum, *Linn.*
Daucus Carota, *Linn.*
Ligusticum, sp.
Petroselinum sativum, *Hoff.*

LXXII.—Cornaceæ.

Alangium Lamarckii, *Thwaites.*

LXXV.—Rubiaceæ.

Anthocephalus Cadamba, *Miq.*
Uncaria Gambier, *Roxb.*
Cinchona Calisaya, *Weddell.*
„ officinalis, *Hook.*
„ succirubra, *Pavon.*
Hymenodictyon excelsum, *Wall.*
Oldenlandia corymbosa, *Linn.*
Ophiorrhiza Mungos, *Linn.*
Randia dumetorum, *Lamk*
Gardenia lucida, *Roxb.*
„ gummifera, *Linn.*
Canthium parviflorum, *Lamk.*
Pavetta indica, *Linn.*
Coffea arabica, *Linn.*
Morinda citrifolia, *Linn.*
Pæderia fœtida, *Linn.*
Rubia cordifolia, *Linn.*
Cephaëlis Ipecacuanha, *Rich.*

LXXVI.—Valerianeæ.

Valeriana Wallichii, *DC.*
Nardostachys Jatamansi, *DC.*

LXXVIII.—Compositæ.

Eupatorium Ayapana, *Vent.*
Blumea lacera, *DC.*
Helianthus annuus, *Linn.*
„ tuberosus, *Linn.*
Siegesbeckia orientalis, *Linn.*
Enhydra fluctuans, *Lour.*
Eclipta alba, *Hassk.*
Guizotia abyssinica, *Cass.*
Achillea millefolium, *Linn.*
Anthemis nobilis, *Linn.*
Anacyclus Pyrethrum, *DC.*
Matricaria Chamomila, *Linn.*
Artemisia maritima, *Linn.*
„ vulgaris, *Linn.*
Calendula officinalis, *Linn.*
Saussurea Lappa, *Clarke.*
Carthamus tinctorius, *Linn.*
Cichorium Intybus, *Linn.*
Taraxacum officinale, *Wigg.*
Lactuca scariola, *Linn.*
Tagetes erecta, *Linn.*

LXXXII.—Ericaceæ.

Gaultheria fragrantissima, *Wall.*

LXXXVI.—Plumbagineæ.

Plumbago zeylanica, *Linn*
„ rosea, *Linn.*

LXXXVIII.—Myrsineæ.

Embelia Ribes, *Burm.*
„ robusta, *Roxb.*

LXXXIX.—Saptoaceæ.

Bassia latifolia, *Roxb.*
„ butyracea, *Roxb.*
Mimusops Elengi, *Linn.*

XC.—Ebenaceæ.

Diospryros Embryopteris, *Pers.*

XCI.—Styraceæ.

Symplocos racemosa, *Roxb.*
Styrax Benzoin, *Dryand.*

XCII.—Oleaceæ.

Jasminum Sambac, *Ait.*
„ grandiflorum, *Linn.*
Nyctanthes Arbor-tristis, *Linn.*
Fraxinus floribunda, *Wall.*
„ excelsior, *Linn.*

XCIII.—Salvadoraceæ.

Salvadora persica, *Linn*

XCIV.—Apocynaceæ.

Rauwolfia serpentina, *Benth.*
Alstonia scholaris, *Brown.*
Holarrhena antidysenterica, *Wall.*
Wrightia zeylanica, *Br.*
Nerium odorum, *Soland.*
Thevetia neriifolia, *Juss.*
Strophanthus, sp.
Ichnocarpus frutescens, *Br.*

XCV.—Asclepiadeæ.

Hemidesmus indicus, *Br.*
Oxystelma esculentum, *Br.*
Calotropis gigantea, *Br.*
Dæmia extensa, *Br.*
Gymnema sylvestre, *Br.*
Tylophora asthmatica, *Wight & Arn.*

XCVI.—Loganiaceæ.

Strychnos Ignatii, *Linn*
„ Nux-vomica, *Linn.*
„ potatorum, *Linn.*
Fagræa fragrans, *Roxb.*

XCVII.—Gentianaceæ.

Exacum bicolor, *Roxb.*
Enicostema littorale, *Blume.*
Canscora decussata, *Rœm.*
Gentiana Kurroo, *Royle.*
Swertia Chirata, *Ham.*

C.—Boragineæ.

Cordia Myxa, *Linn.*
Heliotropium indicum, *Linn.*
Onosma echioides, *Linn.*
„ bracteatum, *Wall.*

CI.—Convolvulaceæ.

Argyreia speciosa, *Swiet.*
Ipomæa hederacea, *Jacq.*
„ digitata, *Linn.*
„ Turpethum, *Br.*
„ purga, *Hayne.*
Cuscuta reflexa, *Roxb.*
Convolvulus Scammonia, *Linn.*

CII.—Solanaceæ.

Solanum nigrum, *Linn.*
„ Dulcamara, *Linn.*
„ indicum, *Linn.*
„ Melongena, *Linn.*
Capsicum frutescens, *Linn.*
Withania somnifera, *Dunal.*
„ coagulans, *Dunal.*
Atropa Belladonna, *Linn.*
Datura Stramonium, *Linn.*
„ fastuosa, *Linn.*
Hyoscyamus niger, *Linn.*
Nicotiana Tabacum, *Linn.*

CIII.—Scrophularineæ.

Herpestis Monniera, *H. B. & K.*
Picrorhiza Kurrooa, *Benth.*

CVII.—Bignoniaceæ.

Oroxylum indicum, *Vent.*

CVIII.—Pedalineæ.

Pedalium murex, *Linn.*
Sesamum indicum, *DC.*

CIX.—Acanthaceæ.

Hygrophila spinosa, *T. Anders.*
Andrographis paniculata, *Nees.*
Adhatoda Vasica, *Nees.*
Rhinacanthus communis, *Nees.*

CXI.—Verbenaceæ.

Gmelina arborea, *Linn.*
Clerodendron infortunatum, *Gærtn.*

CXII.—Labiatæ.

Ocimum Basilicum, *Linn.*
„ sanctum, *Linn.*
Mentha arvensis, *Linn.*
Origanum vulgare, *Linn.*
Hyssopus officinalis, *Linn.*
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