Chapter I. Introduction
Introduction

Indian systems of medicine are claimed to be as old as the sacred Vedas. Mention of the Soma plant and its effects on man is made in the Rigveda, the first of the four Vedas. Rigveda is supposed to have been compiled about 1500 B.C. and is probably one of the oldest repositories of human knowledge. However, it is only in the Atharva Veda dated about 2500 B.C. that we see the earliest attempts at systematisation of medical knowledge. Atharva Veda contains a separate part called Ayurveda wholly devoted to medicine. Ayurveda in one of its divisions deals in some detail with specific properties of drugs and its uses. The next landmark in the history of Indian Medicine is the 'Samhitas' or the collections of Charaka and Sushruta about 1000 B.C. The Samhitas of Sushruta deal more with surgery while that of Charaka more with medicine. The two Samhitas are remarkably comprehensive and contain detailed well classified descriptions of methods employed and materials used. After the Samhitas the next great work in the field of medicine may be said to be that of Vaghbhata about 300 A.D. By this time Buddhism had established itself in India and exerted its influence of Ahimsa (extreme non-violence) in the field of medicine also. Due to this, surgery suffered to some extent; but medicine made a great progress. A large number of valuable drugs were added to the already extensive Indian Materia Medica. There was also systematic
cultivation and investigations of several medicinal plants. Then followed a series of invasions of India by Greeks, Scythians and Mohammedans, and the glories of Hindu medicine rapidly waned and declined. No more original work was written and a good deal of even the existing literature was mutilated and lost. The Muslim conquerors brought their own healing systems and it had Royal patronage. There was intimate contact between the Hindu and Arabian Medicines. The latter added its rich store of drugs to the Indian Materia Medica. But after the fall of the Moghuls, the mohammedan systems also fell into disuse. Then came the advent of the Europeans, - Portugese, French and English. When British rule was established, they organised medical relief through their Allopathic dispensaries and hospitals resulting in the almost complete decline of the indigenous systems of medicine. Thus for almost 1000 years or more the Ayurvedic system of medicine has remained more or less static, and medicine is a progressive science.

However, western scholars with their spirit of enquiry and research began to interest themselves in oriental studies. To them must go the honour of being the pioneers in the field of reinvestigation of indigenous drugs. Among these early contributors (1800-1900) may be mentioned - Dr. Wise, Prof. Hornle, Dr. Julius Jolly, Sir William Jones, John Fleming, Ainsle, Roxburgh, O'Shanegnessy etc. In 1863 appeared Warings Pharmacopoeia
of India to which Monideen Sharif added several supplements. Dutt's translation of the Sanskrit Materia Medica was of great use to future workers. In 1883 appeared Dymock's Vegetable Materia Medica of Western India, and in 1893 was published the very comprehensive book on Indian Medicinal Plants - Pharmacographia Indica by Dymock, Warden and Hooper. A still more elaborate work is the monumental Dictionary of Economic Products of India in several volumes (1899-1904), by Sir George Watt, the Reporter on the Economic Products to the Government of India. This work is the most comprehensive of its kind and brings together a summary of all the previous information regarding Indian Medicinal Plants, their uses, their cultivation and export trade. Other still later contributions in this field are Kanyalal Dey's Indigenous drugs of India and Kirtikar and Basu's Indian Medicinal Plants. The latter contains illustrations of plants which are of great help in their identification. In 1954 A.K.Nadkarni's Materia Medica appeared. Chopra and his colleagues have published several volumes reviewing and collecting all previous work.

All the above authors with a few exceptions like Chopra and others, have mostly collected existing information from ancient and modern texts. Barring a few isolated instances there has not been any concerted attempt at a scientific investigation of the therapeutic properties of the indigenous drugs claimed by the ancient scholars.
The Pharmacology and Pharmacognosy still remained unexplored fields. This is due not only to financial difficulties and want of well equipped laboratories but also due to certain difficulties inherent in the available Ayurvedic literature.

As already stated many of the ancient texts were mutilated or lost, due to the series of invasions. During the centuries, the Indian Materia Medica became too extensive and heterogenous. Several indigenous systems were being practised to suit local conditions and medical treatises to suit localised tracts of the country appeared. Not unfrequently, these treatises contained confusing and contradictory data. Another major difficulty is that of identification of the plants due to want of detailed botanical description. In ancient times the 'rupa' or identification was maintained by actual personal demonstration from generation to generation. Many of the verbal descriptions are now lost. Those available are too inadequate for identification by botanists. Added to this is the confusion due to the old practice of having several synonyms for the same plant. Each local language had its own set of names. The same drug is sold under different names in different parts of India. The result therefore is that many of the drugs mentioned in the ancient texts still baffle recognition and identification. India is a wide country with a variety of soil and climatic conditions. It is well known that plant material shows wide variation in
chemical constituents according to soil, climate, season, time of collection etc. In many cases these conditions have been prescribed in the ancient texts, but where such information is not available it is possible to miss the expected results due to collection of the drug at a wrong season or at a wrong maturity of the plant. Its active principle may be absent or too low. For example, the glycyrrhizin content of the licorice roots from various sources vary from 3 to 12 percent, and the atropine content of Gardenia leaves from 3 to 1.7 percent. It is usual for the modern pharmacologists to search for and isolate the active principles. But in Ayurvedic and Unani medicine, practitioners mostly employ the total crude drug as such and almost always in combination with several other drugs. This is another aspect which baffles the modern investigator.

In view of the above, the question has been asked whether it is worthwhile to carry out investigations on indigenous medicine; whether it yields results commensurate with the expense and the time involved.

In answering this, Chopra et al. (1956) in the preface to their book "Glossary of Indian Medicinal Plants" quote the British Journal 'Practitioner' of December 1953. It is stated "that wise and experienced clinician never spurns an 'old wife's tale' until he has good evidence for doing so. The lore of the countryman is built upon the experience of generations, often of centuries and the data upon which it is based have often been
obtained at a price in human lives which no modern research worker would ever dream of considering".
The authors continue - "In fact we are only at the threshold of work of plant analysis and research.
What is in store, nobody but nature alone knows. The research on these drugs should therefore for these reasons go on for the good of humanity". Ramstad (1959) in the preface to the book 'Modern Pharmacognosy' states that "the drugs of biological origin continue to remain the backbone of drug therapy; in fact they have increased in significance". Lastly, indigenous drugs are definitely far cheaper and within the reach of the masses. But before this can be done it is essential to find out what cheaper, but equally potent substitutes for costlier imported foreign drugs are available in the Indian Pharmacopea. They must be properly identified and standardized after investigating the active principle and therapeutic action. Then the genuine samples can be cultivated and produced in quantities and their standardized preparations manufactured.

Preliminary attempts in this direction were encouraging and therefore Government authorities began to realize the potentialities of many of the indigenous drugs. Therefore they initiated active research on the subject through the Indian Research Fund Association now called the Indian Council of Medical Research. The School of Tropical Medicine, Calcutta was subsidised in 1921 to carry
out pharmacological investigations on indigenous drugs. Herbaria of authentic specimens of drug plants were established at the Indian Forest Research Institute, Dehra Dun, the Central Drugs Research Institute, Lucknow, and The Drugs Research Laboratories, Jammu in the Kashmir State. With the advent of Independence in 1947 several quasi Government agencies initiated research in the field of indigenous drugs. Among these are The Indian Council of Agricultural Research, Botanical Survey of India, The Indian Council of Medical Research and The Council of Scientific and Industrial Research. Government also set up the Central Indian Medicinal Plants Organization and the Central Council of Ayurvedic Research to devote wholly to indigenous drugs. Each of the above organizations specialized in some branch of study of the medicinal plants. The Council of Scientific and Industrial Research commenced re-editing the Watt's Dictionary of Economic Products and are now issuing the same in a series called Wealth of India. Several volumes have already been published containing excellent and up-to-date information along with references.

Recently, a section of The Indian Systems of Medicine was created in the Ministry of Health, Government of India to subsidize and initiate new research on Indian medicinal plants. Different Institutions and University Departments are given grants to carry out specific pieces of investigation.
The Indian Drugs Research Association at Poona was allotted in 1963 the work of carrying out pharmacognostic investigations of a few medicinal plants. This Association is a private organization started in 1943 by honorary workers - Chemists, Microbiologists and Physicians. It has set up a modest laboratory to which is attached a small animal house. Being a private organization set up by private donations its means are very limited. However it is sufficient to carry out the preliminary pharmacognostic investigations, and advantage can be taken of the well equipped laboratories and libraries of other establishments and scientific institutions in Poona like the National Chemical Laboratory, Poona University, Botanical Survey of India, The Maharashtra Association for Cultivation of Sciences, Agricultural College, the Virus Research Centre, Hindustan Antibiotics Ltd., Sashon Hospital etc.

Investigations were therefore started in 1960 on the plants allotted to the Association. The author of the thesis was employed in this work and the results of these investigations are included in the present thesis. According to the instructions of the Ministry, the work on these plants was to consist only identification, macroscopy and microscopy of the plant including some elementary chemical tests. Many of the papers published in India on pharmacognosy of plant material include only
these aspects. Pharmacognosy was understood to mean only that much. But to-day the word pharmacognosy connotes very much more. Since the time Seydler first coined the word 'Pharmacognosy' in 1815 its horizons have very much widened. According to Tschirch one of the founders of Modern Pharmacognosy the term embraces the scientific study of drugs of plant and animal origin from every view point. According to Ramstad "Pharmacognosy.... must of necessity be of very broad scope,. The fields of specializations which pharmacognosists may choose include taxonomy, anatomy, morphology, plant physiology, genetics, biochemistry, phytocchemistry, drug-plant cultivation, microbiology..."

Accordingly several other aspects were included in the present investigations.

Scope of the Thesis:

Briefly the scope of the thesis consists of investigations on the following six plants:

1. Chitrak-Plumbago zeylanica Linn. The roots of Chitrak has been described as a digestive stimulant, and a cure for skin diseases.

2. Bakuchi-Psoralea corylifolia Linn. The fruits are supposed to be a specific for leucoderma and other skin infections.

3. Sakhotaka-Streblus asper Lour. The root bark is locally used as a cardiac stimulant.

4. Aragvadha-Cassia fistula Linn.

5. Danti-Saliospermum montanum Muell Arg.
6. Trivrut-Operculina turpethum Silva Manso

The fruit pulp of Aragvadha and the roots of Danti and Trivrut are described as cathartics in Ayurvedic literature.

Each of the above plants have been studied for the following:

1. Literature in ancient texts.
2. Review of references to modern literature if any.
4. Botanical descriptions of the plant.
5. Detailed microscopy of the part used.
6. Phyto-chemical tests, extractives, ash etc.
7. Attempts at isolation of chemical principles.
8. Study of the attributed therapeutic property by administering the isolated principle or the total drug to laboratory animals.
9. Toxicity of the drug by using mice.

In each case a bibliography of references quoted is given at the end of the chapters along with a summary of the findings. In Chapter II the routine methods employed are briefly described. The specific methods are given in detail at the relevant places.