REALMS OF AYURVEDA
REALMS OF AYURVEDA
SCIENTIFIC EXCURSIONS
BY NINETEEN SCHOLARS

Edited by
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PREFACE

The credit for the publication of this collection of discourses on various aspects of Ayurveda by India's front rank talent in the field of Ayurvedic education, profession, research, pharmacy and pharmacognosy, should primarily go to the two great qualities of the modern medical scientists—scientific curiosity and intellectual honesty. When these qualities characterise the audience also, the exponents become inspired and give out the best from their learning and knowledge. Of course, the instructor, while giving his best, cannot transcend the limits of his own knowledge. This has to be kept in mind in the assessment of the worth of this work.

The initiative came entirely from the West. It was the Southern Illinois University School of Medicine, Springfield, that conceived the idea of carrying out a survey of the indigenous systems of medicine of such countries of the world as continued to support and cultivate them either as officially recognised or as popularly supported systems. Obviously, a science like Ayurveda, enjoying both the status symbols—immense popularity among the people of India and official recognition (through a regular Gazette notification) by the Government of the country as an equal partner with modern medicine in the National Health Services and, in addition, having become an object of international study among the most advanced countries of the world, such as the USA, Japan, West Germany, etc., could not fail to attract the attention of the SIU study teams.

For a preliminary assessment of the potentials of Ayurveda in the field of medical research and relief, the SIU School of Medicine invited the President of the statutory Central Council of Indian Medicine to the States, along with nine other universities, to introduce them to the theory and prac-
tice of Ayurveda. Apparently, the visit of the Indian expert succeeded in arousing adequate interest in the minds of the hosts to induce them to send a study team to India to carry out an on-the-spot and in-depth study of the Ayurvedic system of medicine.

The six-member delegation from the SIU representing six different disciplines of modern medicine (including surgery) arrived in India on January 19, 1978 and returned to the States on February 14, 1978. Some idea of the intensity and immensity of the effort of the delegates to learn as much as possible of Ayurveda within this short period of their 25 days' stay in India and that of their Ayurvedic hosts to provide them with the maximum information and insight into the subject of their inquiry can be had by a perusal of Appendix II which gives the delegation's itinerary in India. The original draft containing the genesis of the project, as received from Dr. Glen W. Davidson, has been reproduced verbatim in Appendix I for the benefit of those readers who may be interested in going through it. Appendix III reproduces the interview granted by the project co-ordinator of the study group, Dr. Davidson, to a representative of the Times of India. It contains many significant observations which, coming from an eminent and impartial foreign medical scientist, after his intensive 25-day contact with Ayurveda, assume special importance in assessing the potential utility of the Ayurvedic medicine in world medicare.

Most of the lectures contained in this volume have been reproduced exactly as they were delivered, but a few of them, probably not more than three, were written down from memory quite some time after they had been delivered extempor. There may be some omissions or some additions in case of those lectures as it could not be possible to reproduce the exact texts from memory. However, these small variations would not constitute any significant departure from the content of the originals.

The formal invitation to the delegation, to enable it to come to India, was issued by the Central Council of Indian Medicine. The Council received the co-operation of the All India Ayurvedic Congress, the International Ayurvedic Society and the Indian Ayurvedic Aid Society in organising
the arrangements for the board, lodging and travel of the delegates during their stay in India. The last named of these organisations, the Indian Ayurvedic Aid Society, generously took over the responsibility for meeting the costs involved in making the arrangements and therefore deserves a special mention. Three eminent philanthropists on whom the Aid Society chiefly leaned to meet the expenses are Seth Dharam- sey M. Khatau, Seth Arvind N. Mafatlal and Mr. R. C. Burman. At the American end, the support given to the project by the young Indian industrialist, Mr. Shrikumar Poddar, deserves special mention and appreciation.

The former Prime Minister, Shri Morarji R. Desai and the then Union Health Minister, Shri Raj Narain deserve gratitude for extending their personal support to the project.

It is hoped that apart from the upsurge of interest that the successful execution of the project has triggered in the United States, its being instrumental in eliciting the scientific Ayurvedic material presented in this volume will place in the hands of both the modern medical and the Ayurvedic profession a unique presentation of and introduction to various aspects of Ayurveda along with its fundamentals which seem to possess an element of eternity in them.

SHIV SHARMA
When Rudyard Kipling sang "The East is East and the West is West and never the twain shall meet", he little realised that it would hardly take a lifetime for the onward march of science to render his famous song meaningless and out of date, for, here today, the front rank representatives of the western medical science are meeting the ancient medical knowledge and wisdom of the East, at as close quarters as it is possible to do.

Physical distances have shrunk beyond conception and enlightened organisations of forward-looking scholars are working earnestly to remove the educational, cultural, economic and allied barriers between nations on one hand, and bridge the ideological gulfs existing between men on the other.

The progress in many directions has been spectacular, even if the phenomenon of spectacularity, if I may use that expression, progressively becomes less and less marked as we move from the sciences of matter to the sciences of life, and from the sciences of life to what the ancient thinkers have called the sciences of the spirit.

Even as the techniques of investigation and acquisition of knowledge attain unbelievable heights of precision and utility, newer and newer dimensions of knowledge reveal themselves to the earnest scientist beckoning him to proceed further and further into the unfathomable depths of the outermost reaches of the universe on one hand and the innermost resources of the mind on the other. Giving an expression to his characteristically searching mind, the late Dr. Kenneth Walker, in his delightful and thought provoking treatise, *The Doctor Digresses*, likens acquired knowledge to a ray of light and
intriguingly points out that the immediate area of darkness surrounding a ray of light increases in direct ratio with the increase in the circumference of the shaft of light. As the circumference of the acquired knowledge becomes larger and larger, the awareness of the Unknown outside the immense territory becomes more and more pronounced.

It is this awareness that explains the true scientist's humility and tolerance, earnestness and receptivity and unwavering readiness to investigate, with an open and unhesitating mind, even the smallest piece of information, irrespective of his personal bias on the scientificity or the credentials of the source of his information.

I had to say this to express my deep appreciation of your desire to explore Ayurveda to reach it. To my mind this study-project of yours is symbolical of the spirit of true inquiry which transcends all bias and which cuts through time and space to create a meeting ground not only between the "twain", the East and the West, but even between the Ancient and the Modern. I may repeat the words of Charaka:

Kritisno hi loko buddhimatam-acharyah
Shatrushchabuddhimatam.
The entire world consists of teachers
for the wise and enemies for the fools.

My high rating of the spirit of your study disconcerts me somewhat. It makes me conscious of my debt to the Southern Illinois University whose hospitality I have enjoyed, a debt which has, of necessity, to be met from within the modest resources of my limited knowledge. These may be too inadequate to redeem the debt. I can give you only one assurance—that if your scientific investment involved in extending your generous search and investigation to Ayurveda does not prove satisfying or rewarding, it shall not be for any want of effort on my part. In that case, the only solace I can offer you is that the failures in scientific efforts always outnumber the landmarks which crown their success.

I will now introduce you to Ayurveda for study whereof you have crossed the seven seas. The first thing I want you to mark is the name of the ancient Indian Medicine, i.e., Ayur-
veda. The very name stands in a class apart from the names of all the other medical systems in the world.

What I am referring to as modern medicine in this introduction has a number of names such as 'cosmopolitan medicine' (which is the favourite choice of the eminent American, Prof. Charles Leslie), 'scientific medicine', 'Western medicine', 'allopathy' (the word coined by Dr. Samuel Heinemann in contrast with the system he founded, namely, Homoeopathy); but none of these names is free from the idea of disease or its treatment; the word 'pathy' or 'medicine' being inseparable from the nomenclature. Similarly, the terms Unani Tib (Greeco-Arab Medicine), Naturopathy or Nature cure, Hydrotherapy, Naturopathy, Chromopathy, 12 tissue remedies, hypnotherapy, psychotherapy, etc., all contain, as part of their names, words which point out to 'disease' or its treatment and cure. Ayurveda differs from all these in so far as it does not contain any hint of health, disease or treatment.

Ayurveda consists of two words, 'Ayur (s)', meaning life, and 'Veda', meaning science or knowledge. Literally, therefore, Ayurveda means the science of life. This covers the art of living.

A science or a pursuit has always an objective (Prayojana) before it. The objective of Ayurveda is maintenance of the metabolic equilibrium of the human psychosomatic machine and the restoration of the same to normality if the homoeostasis is upset or disturbed by undesirable factors.

Health (Swasthya) is defined as (a) well balanced metabolism (Dhatusamyata) plus (b) a happy state of the Being, the senses and the mind (Prasanna-Atma-indriya-manah). 'Senses' here means the five organs of perception (smell, taste, sight, touch and hearing) coupled with the five organs of action, namely, mouth, hands and feet, and organs of speech, excretion and reproduction.

Disease (Vyadhi) is defined as Dukkha-Samyoga, i.e., "contact with unpleasantness, physical or mental." Dukkha has no exact equivalent in the English language; it stands for physical discomfort, pain or suffering, as well as for mental anguish including the pangs of jealousy, anger, fear, avarice, greed, hate, passion, harshness, cruelty, sorrow, etc., all that is unpleasant to the body and/or the mind.
Disease is four-fold: 1. adventitious (Agantuka), 2. physical (Shartrak), 3. Mental (Manasika), and 4. Natural (Svabhavika).

The adventitious disease results from external factors: cuts, bites, stings, injuries, accidents, etc.

The physical disease consists of internal ailments, nutritional and metabolic imbalances, growths and inflammations, diseases of infection, tissue degeneration, etc. Infectious diseases, in Ayurveda, even though of external origin, are included in the physical diseases, as no infection takes place in the presence of immunity—an internal trait.

Mental disease, in Ayurveda, differs from the mental disorders as understood by the modern medicine. Diseases like insanity, schizophrenia, hypochondria, melancholia, paranoia, etc., which are partly mental and partly physical, and which do respond to tranquillising drug treatment to a certain degree, do not represent the true Ayurvedic concept of the mental disease which is represented by states of anger and wrath, pride and vanity, greed and avarice, treachery, falsehood, indiscipline and uncurbed desires, hate, fear, cruelty, distress, sorrow, anxiety, unhappiness, laziness, etc.

Natural disease covers birth, natural old age, death, natural hunger, natural thirst and natural sleep, as these phenomena do not fall outside the definition of disease, i.e., Dukkha-Somyoga (contact with unpleasantness) given above.

Generally speaking, the adventitious disease is treated surgically, the physical disease medically, the mental disease psychologically and the natural disease spiritually. This is Ayurveda in a nut-shell.

The definition of treatment in Ayurveda (Upashaya), is the widest imaginable by any system of medicine:

A salubrious use of (a) drugs (Aushadha), (b) diets (anna), and (c) practices (vihara), prescribed jointly and severally, (i) contrary to the cause of the disease, (ii) contrary to the disease itself, or (iii) contrary to both the cause and the disease, or (iv) similar to the cause of the disease, or (v) similar to the disease, or (vi) similar to both the cause and the disease, constitutes treatment (Upashaya).
INTRODUCTION TO AYURVEDA

This covers all the principles of allopathy, homoeopathy and naturopathy. There are 42 alternate therapeutic approaches arising out of the permutations and combinations offered by this definition. This explains why the Ayurvedic system is not in a position to disapprove of any of these 'pathies' and also why it is called the mother of medical sciences. Homoeopathy (treatment by similars) and allopathy (treatment by contraries) can be regarded, in the words of the founder of the former, Hahnemann, "the exact opposite" of each other. But to Ayurveda both are acceptable alternate approaches. Thus, the homoeopathic opium which cures constipation and the allopathic opium which causes it, both fall within the Ayurvedic therapeutic measures.

The definition of medicine is even wider: "Nothing exists in the realm of thought or experience that cannot be used as a medicine (i.e., a therapeutic agent)." What it really means is that all existing phenomena, physical or physiological, psychic or emotional, e.g., anger and tranquility, joy and sorrow, fear and confidence, love and hate, food and drinks, drugs (of mineral, vegetable or animal origin), fasts, massages, postures and exercises, desirable or undesirable experiences or situations, social, climatic or geographical conditions, laudatory or adverse comments, abuse or praise, good, bad or indifferent thoughts, etc., have a bearing on the body chemistry. There is nothing that can be experienced or conceived of that does not influence the body or the mind of the individual to a lesser or to a greater extent. Merely hearing the name or thinking of a friend or foe can affect the metabolism for better or for worse. Since anything that affects the constitution one way or the other can be utilised as a therapeutic agent, there is nothing that is not medicine.

Tridoshas

In Ayurveda the tridoshic concept is the pivotal principle. What does it really mean? There are three basic constituent complexes in the physiological system, called the doshas or the dhatus. We can treat these two words as synonymous. The doshas or dhatus are the irreducible ultimate basic metabolic principles governing the entire psychosomatic structure
of the living organism. They are classified into vayu (or vata), pitta and kapha (or sleshma). These terms cannot be easily rendered into modern medical terms. In literal translation they could be called "wind", "bile" and "phlegm". But this is highly misleading. Actually, the terms embrace much more—between them they sustain the whole body metabolism. Or to put in another way, the whole physiological system can be somatotyped according to these three doshas.

No true mono-doshic individual exists. Matter, in order to be animate, has to be tridoshic. Life is inconceivable in the absence of even one of the doshas. An ideal balance between the activities and structure of the three respective doshic factors constitutes the 'absolute normality' of the constitution, i.e., a perfectly normal state of health from the metabolic viewpoint. In reality, however, such a norm does not exist as the psychosomatic and metabolic structure is not fixed and rigid. It fluctuates not only from individual to individual, but within the individual himself. Therefore, it is the predominance of a particular dosha in an individual that decides his type, and not the absence of the other doshas. Even where a dosha is predominant, the activities of the non-predominant ones cannot fall below a certain minimum. There are limits within which the minimum tridoshic equilibrium must be maintained; outside these limits, the organism will cease to live. Between this lowest limit and the 'absolute' normal, there exist innumerable permutations and combinations of the tridoshic activities which represent as many deviations from the normal. Once the disturbances in the equilibrium cross the limits of the wide latitudes provided for the concept of health, the prakriti (normal condition of psychosomatic health) changes into vikriti (vitiating normality, disease).

The following translation from a passage in Sri Svatatvarainakara will indicate that the tridoshic concept dominates the entire kingdom of life and is not confined to the animal kingdom exclusively. In other words, all protoplasmic matter, constitutionally, is tridoshic in nature from its highest to its lowest forms:

"The (health and) disease in plants, as in human beings, are based on the respective (normality and abnormality of
the functions of) vayu, pitta and kapha. Therefore, the doshic abnormality should be removed. Whether tall or short, when a tree exhibits the characteristics of leanness, dryness, sleeplessness and subnormal sensibility, and is deficient in bearing flowers and fruit, its constitution is vatic. Again, if a plant cannot tolerate the heat of the Sun, is pale, deficient in branches, prone to ripen before time, it is paittic in nature. A plant which has fully developed with a heavy stem and branches, is resplendent with flowers and fruit, has a large girth and is covered with creepers, is of kaphaic constitution”.

Thus the early Ayurvedic physicians had completed the task of somatotyping not only the humans but the entire living protoplasmic matter. The three doshas are the ultimate irreducible systems of every type of living protoplasm, both at the physiological and the psychological levels.

The Three Psychosomatic Types

The humans were divided into three psychosomatic types, namely, the vata-prakriti, the pitta-prakriti and the kapha-prakriti. It is interesting to note that Dr. W.H. Sheldon, in his modern classics on somatotyping, “The Varieties of Human Physique” and “The Varieties of Temperament”, has divided humans into three basic types—ectomorphs, mesomorphs and endomorphs. Compared with the Ayurvedic classification, Sheldon’s classification appears almost elementary, based on inadequate knowledge of the total psychosomatic human machine—its internal and external mechanisms, how they interact and how they influence the constitution apart from the influences exerted by the environment.

It is utterly impossible to offer an exposition of the full tridoshic concept within the limited scope of this article. Since ‘medicine’ in Ayurveda covers every thought, action, word, experience and substance that exists in the world, there is nothing we can think of that shall not fall into one of the three categories of the vatic, paittic and kaphaic kingdoms. Thus, the sun is paittic and the shade is kaphaic or vata-kaphaic in nature. A stimulant is a paittic drug and a sedative-
a *kaphaic* drug. An alcoholic drink, being *paittic*, will increase
the *paittic* activity in the body and the anti-*paittic* or *kaphaic*
cocoanut water will counter the action. Again, anger will
intensify the *paittic* activity in the body and cheerfulness the
*kaphaic* and anti-*paittic* activity.

No thought, word, action, experience, occurrence or sub-
stance, coming into physical or psychic contact with the
living organism, fails to exert an influence, howsoever small,
on its *doshic* equilibrium. The *pitta-prakriti* individual, for
example, when subjected to the use of purely physical factors
such as *makaradhwaja* (a ‘heating’ Ayurvedic stimulant),
musk, asafoetida, ginger, chillies, brinjals, or their modern
counterparts such as adrenalin, thyroid, hydrochloric acid, or
fish, pistachio, cashew and walnut, stimulants and ‘hot’ spices,
or emotional factors like an upsurge of courage or anger and
wrath, will find them acting adversely on his constitution as
all of them, being *paittic* in nature, will aggravate his already
*pitta*-dominated metabolism. Contrarily, these very factors
will prove beneficial to the *kapha-prakriti* individual as they
will counter his proneness to *kaphaic* disorders.

Since all physical, physiological and/or psychological
phenomena influence these ultimate irreducible basic psycho-
somatic constituents of the living matter, the *tridoshic* complex
has been aptly interpreted as the physico-physio-psychological
organismal phenomena complex.

The unbalancing of the *doshic* equilibrium constitutes dis-
ease. Restoration of the constitution to a balanced metabolism
constitutes cure. Maintenance of the normal metabolism with-
in the permissible latitudes and its protection against invasion
by any disturbers of the equilibrium—emotional, dietetic,
internal, external, epidemic or any other factor—constitutes
hygiene.

To understand what the *tridoshas* really mean, take the
example of a motor car in motion. The state of motion is
possible because the car has a body to begin with. But the
body and the motion cannot exist together without producing
or losing energy. In the case of the moving car, the energy is
produced in the form of heat. To control the heat thus pro-
duced, the machine has to be provided with an anti-heat
factor. The water in the radiator, the oil in the engine and
the greases for lubrication of the various parts are some of the constituents of the car’s total anti-heat complex. In this extremely simple and crude example, if we compare the motion with *vayu*, the heat with *pitta*, and the lubricants with *kapha* or *sleshma* of the human body, we have a base to understand the structure of the *tridoshic* equilibrium.

The *doshic* types differ in health. They also differ in disease. They differ in susceptibility to disease, to action of the drug, to allergies to various substances, emotions and conditions. One may get urticaria due to anger, another due to cashew-nuts, yet another due to pollen or dust, to humidity, to dryness, to heat, to cold, to sun, to rain, to the absence of one’s spouse (or to the proximity of one’s spouse!). In each case, the *doshic* constitution and the *doshic* relationships play the major role, and restoration of the *doshic* equilibrium constitutes a cure. By and large, one type is prone to one set of diseases, another type to another set. This holds true in case of seasons, foods, climates, emotions—all factors that have a bearing on the psychosomatic mechanism of the being.

The physician’s job is to evaluate the *doshic* picture of the patient and the disease. In modern medicine, the doctor tries to find out what type of disease the patient is suffering from. In Ayurveda, it is even more important to find out *what type of patient is suffering from the disease*. The Ayurvedic physician has to elaborate the *tridoshic* pattern of the deviation from the normal in relation to every drug-, diet-, or practice-factor; he has also to determine the vitiating or *dosha*-disturbing causes—physical, physiological or psychological. It is only then that he can try to restore the equilibrium through administration of drugs, diet and/or practices.

Are there then fundamental differences in the definitions of the human physiological system between Ayurveda and modern medicine?

From the point of view of treatment, the fundamental basis of Ayurvedic medicine is the *doshic* relationship between the constitution of the patient and that of the therapeutic agent. Apparently, there are differences between the Ayurvedic and the allopathic definitions of various psychosomatic constitutional components and systems of the human body.
The Ayurvedic definitions as shown earlier are, by and large, broader and more general, while the modern definitions are narrower and more specific. However, the area of direct clash of viewpoints is negligible. At one time, the slogan that modern medicine treats the disease and Ayurveda treats the entire patient was wholly justified. Today, with the widening of horizons of modern medicine, it is progressively veering round to the overlapping of the Ayurvedic approach, even though, strictly speaking, the Ayurvedic treatment still remains patient-oriented and the modern treatment disease-oriented.

It is also true that Ayurvedic diagnosis is based chiefly on intensive observation and experience even if not always on intuition. Great importance, however, was given to ‘intuition’ in ancient India. Quite often, the Ayurvedic physician rejects the laboratory diagnosis if it clashes with his conclusions and, more often than not, it is found that the mistake has occurred in the laboratory. Yet, Ayurvedic physicians appreciate the value of the laboratory approach to diagnosis and are making full use of available methods for the benefit of the patient. However, it may be stated that in the case of the large number of patients suffering from “undiagnosed diseases” knocking at the doors of various hospitals and physicians all over the world, the generalised Ayurvedic constitutional approach may prove more helpful than the highly specific laboratory approach, not to speak of the deleterious side-effects of modern drugs as against the ‘side-benefits’ of the Ayurvedic medicine. Strictly, Ayurvedic diagnosis, within its own fundamental setting, is quite firm and practicable.

A most common misconception prevalent today is that Ayurvedic treatment is nothing but herbal cure. In fact, the term ‘herbal cure’ is no more synonymous with the term ‘Ayurvedic cure’ than the term ‘allopathic cure’ is synonymous with ‘scientific cure’. Although Ayurveda uses thousands of herbs, it also prescribes thousands of metallic preparations. It also uses animal products like musk, ox gall and ambergris. It is only in the West that herbal cure is looked down upon as, in most cases, the Western herbalist is an unqualified person without the backing of a full medical science like Ayurveda behind him. The modern Indian doctors
are today quite busy in the research laboratories working on these herbs and the conflict that existed between Ayurveda and allopathy during the early years of India’s Independence has practically disappeared during the last decade. Top Ayurvedic physicians and modern medical men are cooperating and giving their full support to each other in a large number of research centres in India today. If there exists any prejudice against ‘herbal cure’ in India today, it must be in the minds of the fading older generation of doctors who mostly took their cue from the British who did and do look down upon their herbalists in the United Kingdom.

Collaboration of Ayurvedic physicians, with modern experts, working in a hospital unit or wing, maintaining correct data from both the modern and the Ayurvedic angles, will be a good proposition for the moderns to study and evaluate Ayurveda; only through continued observation and practice can the proper knack be developed by the Western-trained physician to practise Ayurvedic medicine successfully.

In the practice of Ayurveda, there is very little danger of deleterious side-effects. The only drawback in the pure observational and institutional approach, however well-developed, lies, in certain cases, in diagnostic mistakes. For example, a cerebral tumour, undetected in the absence of modern diagnostic facilities, can be mistaken for migraine. This can be prevented by the collaboration technique offering hospital diagnostic facilities, as suggested above. Such an experiment conducted with the characteristic efficiency and thoroughness of a western scientific effort, should pay rich therapeutic dividends.
The reason for bringing out the salient differences between Ayurveda and modern medicine is that a narration of the factors common to both the systems is not calculated to add to the knowledge which the moderns already possess. It is therefore my intention to highlight only those aspects of Ayurveda where it distinctly differs from modern medicine.

The first significant difference between the two sciences consists in the meanings of their respective names—Ayurveda, on the one hand; and "scientific" medicine, modern medicine, western medicine, world medicine, cosmopolitan medicine or allopathy, on the other.

It will be noted that the term 'Ayurveda' is singularly free from any reference to medicine, cure, therapy, 'pathy, etc. The name does not give the remotest hint that it is a system of treatment. In this matter, it differs from all the other systems dealing with health and disease. Naturopathy or nature cure, homoeopathy, chromopathy, hydrotherapy, hypnotherapy, magnetotherapy, etc., all connote an approach towards the prevention or cure of disease, or the restoration or preservation of health. Ayurveda alone is a term that implies an approach to total life. It consists of two words, *Ayus*(*r*), meaning life and *Veda*, meaning knowledge or science. The literal meaning of the term is 'the science of life' which is identical with the modern word 'biology' (*bios*=life, *logos*=knowledge or science). But whereas biology is a cut and dry science of life, the actual meaning of Ayurveda is the science of life and *living*. The difference between Ayurveda and

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* This meaning has been elaborated in more than one chapter in the present volume.
biology becomes apparent as soon as you convert the words into their adjectives and apply them to the character of an individual. A man observing biological morals is morally very different from the one observing Ayurvedic morals.

Different Origins

The second major difference between the two systems lies in the nature of their origins. According to the ancient seers who have bequeathed Ayurveda to us, it was primarily of divine origin. In present day terms we can, perhaps, say that the development of Ayurveda was based on intuition and revelation whereas modern medicine has progressed through observation and experimentation. It is easy to understand how the moderns developed their knowledge gradually, how they confirmed their hypotheses and postulates in order to arrive at their conclusions and how they built up their great science of medicine which has been successful in removing the scourge of a number of fatal diseases including the many epidemics that plagued mankind in the past. In contrast, it is difficult to visualise or arrive at the process by which the ancients reached their conclusions, as clear cut experiments on men or animals have neither been prescribed nor described in detail anywhere. If a competition existed between the two sciences, it would have to be described as intuition vs. experimentation. Of course, the ancients, too, have leaned heavily on observation (pratyaksha or direct sense perception) and inference (anumana), along with intuition. Intuition has been claimed to be of divine origin. In fact, the ancient texts of Charaka and Sushruta go further. They claim that Brahma, the Lord of Creation, composed a stupendous work on Ayurveda as a part of the Creation itself. It is on the basis of this belief that Ayurveda is without beginning. It is as old as life.

It is only fair to say that you are free to treat this belief as a legend or a myth. For us, the traditional Ayurvedic physicians, it is easy to accept the divine origin of the universe and of Ayurveda, as we have grown up with the belief that all phenomena around us are part of a divine design. Perhaps this is the only explanation, in the absence of any other, as to how the ancients acquired their profound
truths in those early times; truths which continue to defy, up to this day, any successful refutation or replacement of the fundamentals established by them, and which continue to compete successfully with their modern counterparts, without enjoying or occupying any special position of vantage as other competing techniques sometimes possess. In this context the following words of Einstein, perhaps the greatest name among the giants of modern science, will be found intriguing:

In a certain sense, therefore, I hold it to be true that pure thought is competent to comprehend the real as the ancients dreamed.\(^1\)

Disparate Wisdom and Knowledge

A third difference between Ayurveda and modern medicine lies in the balance between the twin faculties called knowledge and wisdom as seen during the respective eras which gave Ayurveda of the pre-historic age and allopathy of the atomic age to the people of this world.

Is it mere chance that the synonyms of the word ‘knowledge’, both in Hindi and Urdu, i.e., Jnana and Ilm, belong to masculine gender and those of ‘wisdom’, i.e., buddhi and aql to feminine gender? What I am trying to convey through this question will be clear from the story of the twins, a brother and a sister, who were asked about their age by a friend. The brother replied:

Of course, we entered the world together as twins, and continued to be of identical age for about five years. Thereafter, as years rolled by, I started out-distancing her. By the time I was ten she was lagging behind at nine. When I was twenty, she was fifteen. I am now forty, and she is twenty-five. It appears that with the passage of time this disparity in our age will continue to grow more.

Perhaps this story is an answer to the question why America has never had a woman president. The explanation
I have heard is that the American constitution does not permit a person of less than thirty-five years to stand for the high office, perhaps the highest in the world; and no American woman is prepared to concede that she has completed thirty-five years of her life even if she has to lose the prestige of holding such high office. This explains the relevance of my reference to knowledge and wisdom as masculine and feminine words respectively in all the Indian languages, for, although during the pre-historic period when Ayurveda was born, the twins were keeping abreast of each other, the feminine wisdom started lagging behind and the masculine knowledge continued to grow with the passage of centuries and milleniums until, today, the very magnitude of the gap between the maturity of knowledge and the immaturity of wisdom has imbalanced humanity as a whole and brought it to the brink of possible universal destruction. As Prof. Toynbee has said:

Science too, is a necessity of life, but the science that is indispensable is elementary. Scientific observation and reasoning were required for making the earlier paleolithic tools. The elementary science sufficed to secure the survival of our species. *The enormous subsequent advance of science has been superfluous for the purpose of survival, and it may actually end in self-destruction.*

To sum up, Ayurveda is the product of an age when the relationship between knowledge and wisdom was well balanced. Allopathy is the product of an age in which knowledge has advanced by leaps and bounds but wisdom has failed to grow like the twin sister in the above story. The only difference between the last two lies in the fact that the sister grew but did not reveal her growth, whereas wisdom has actually not grown and is lagging behind knowledge, greatly endangering the future of the human race.

**God, Karma and Prayer**

The fourth major difference between Ayurveda and allopathy lies in the belief of the former in God, Karma, and Prayer, phenomena which find no place in modern medical
science. The corpus of the total concept of Ayurveda is so cleverly formulated that if all references to God, Karma, prayer, or religion were expunged, the remaining text would not show any gaps. The purely scientifico-therapeutic portion would remain a complete whole, without revealing any inconsistency in the continuity of the texts from which the metaphysical passages have been removed. However, notice should be taken of the fact that the ancients who gave Ayurveda to us did believe in the aforementioned metaphysical and religious concepts.

It is open to the present day scientists to discard this aspect of Ayurveda without fear of losing the substance of the purely material and mundane aspects of the Ayurvedic therapeutics.

The reasons that the Ayurvedic seers have advanced in support of the argument for the existence of God are based on the orderly design of the Universe. Perhaps I could convey the ancients’ viewpoint better by citing an example from modern physics. Modern scientists consider the laws of physics as more consistent than the laws of religion or faith. There is a physical law that all things expand when heated and contract when their temperature is lowered. Observation supports this law. And yet, there exists a well-known exception to the rule, namely, water. When you lower the temperature of water, it continues to contract in volume until it reaches 4°C. If it is cooled further, it starts expanding, so that when it turns into ice at 0°C, it is lighter than the water at 4°C and therefore comes to the surface instead of remaining at the bottom. This peculiar and exclusive behaviour on the part of water saves countless fish under the frozen surfaces of lakes, rivers, seas and oceans in cold zones, which, but for this phenomenon, would be embedded in and crushed by ice beneath the surface of the water which would be bound to grow thicker and heavier in the lower reaches, if it did not prove an exception to the rule. Many ships sailing in the colder zones would have their under-carriages and ballasts crushed by submerged ice. But for this phenomenon there would have been a tremendous loss of life and material and no food left for Eskimos or other dwellers of the Arctic and Antarctic regions.
Now, an ancient seer, looking at this phenomenon, would ask the question, “Is it water itself that has taken a decision to rebel against the otherwise concomitant law of physics, regarding the relationship of respective expansion and contraction on being subjected to heat and cold or, is it the design of an intelligence behind the phenomenon?” Obviously, the answer of the modern scientist would be that it is a matter of pure chance that water happens to have developed a faculty or a habit or a property, which conveniently makes it expand on further cooling below 4°C. The Ayurvedic seer sees in it the hand of God since this peculiarity in the behaviour of water offers protection to life and property on a gigantic scale.

Some humorist has poked fun at looking at the same water from different angles even in this matter-of-fact life of ours. When a pet dog of a teacher of chemistry urinated on the floor, he pointed it out to his little son and said “Look, H₂O” and the brilliant son replied “No, daddy, it is K₉P (canine pee)!” Although the example is sheer nonsense, it does give an idea of how two people can describe an identical substance from two different angles. Some of our more enthusiastic and modern young Ayurvedists describe the āp bhūta, one of the five proto-elements constituting the universe of matter, as Water (H₂O) without realising that H₂O, according to the basic concepts of Ayurveda, is not a single element or proto-element, but a combination and a product of all the five mahabhūtas or conceptual proto-elements, which constitute the material universe.

In Ayurvedic Medicine—Past and Present* the subject of prayer has been dealt with at the very beginning under the caption “Science and Religion”. However, here is a passage from an extremely useful and practicable book, Psychology for the Armed Forces, ably edited by Edwin G. Boring of Harvard University:

All reports from men who have seen troops facing danger at the front show that a trust in God and a belief in any kind of immortality is a great supporter of morale. Men

*By the Author.
who have faith in the power of prayer find that it works for them, gives them assurance, lessens fear.\(^3\)

The more faith one has in prayer the greater shall be the change for the better in the body chemistry. If a physician can tap this additional source of energy it will be unwise not to exploit its potential for the benefit of the patient. It is highly unscientific to deprive the patient a chance of recovery by refusing to take advantage of his attitude towards faith which the physician considers "unscientific". That would preclude shock therapy in schizophrenia which would be an act of unrealistic thinking. Anything that cures should be accepted as a cure.

Free Will and Responsibility

The non-identical behaviour of two physically similar twins, and the increasing incidence of rebellion against and deviation from intended and set norms of projected behaviour among humans than among animals, even in countries where the methods of state control of the human mind have been perfected into almost an exact science, point unmistakably to the existence of strong innate urges and influences on the minds of men which are capable of neutralising the most intelligently and scientifically thought out, carefully planned and most efficiently and ruthlessly executed methods of shaping human behaviour along fixed patterns. The most fanatical believers in the executors and enforcers of the totalitarian brands of discipline have themselves been found to defect from the "ideal" states seeking asylum in free areas. Some of the greatest thinkers and writers who have suddenly sprung into the limelight in this world are defectors from totalitarian regimes where every effort had been made to shut out every unapproved thought from coming into contact with the mind of the totally controlled citizen. Obviously, it is something volitional that makes a citizen revolt here and another rebel there against the rigid and effective blanket pattern of thought and behaviour to which the general mass of relatives, friends, associates and compatriots around him has submitted with utmost and highly infectious docility. What is the name of
the vaccine that prevents the rebel, the dissident, the defector and the seeker of the asylum from catching the strong environmental infection of a gutless submission, conformity and docility, if not *Karma-Sanskara complex*?

In any case, *Karma* is the name chosen for individual behaviour-cum-destiny by ancient Indians for the obvious reason, that it not only explains fairly reasonably the phenomenon of differences in deviational behaviour in the midst of rigidly fitted psychological straight-jackets, but also otherwise constitutes a positive concept, promoting hope and faith in ultimate justice. It is the only concept that does not accept miscarriage of justice or undeserved infliction of suffering on the innocent as a *fait accompli*—for nemesis awaits the evil-doer and will overtake him sooner or later. It is a concept which, as H.G. Wells said about God, has to be invented, if found non-existent, for the protection and promotion of the best of human values.

Moreover, the concept of *Karma* promotes endeavour in the face of frustration, and encourages persistence and determination in the pursuit of excellence. It would not be out of place to quote here a passage from Winwood Reade’s *The Martyrdom of Man*:

“God made all men equal” is a fine sounding phrase... but it is not a scientific fact. On the contrary, there is nothing so certain as the natural inequality of men. Those who outlive hardships and sufferings which fall on all alike owe their existence to *some* superiority, not only of body but of mind.

The notion that belief in *Karma* leads to fatalistic resignation is based on a wrong understanding of the concept. Lord Krishna in *Gita* and Punarvasu Atreya in *Charaka Samhita* have emphasized the role of *Karma* (action) as a powerful stimulus in the generation of endeavour. Charaka says: *Daivam purushakareṇa balavadapi hanyate*—“A powerful endeavour in this life (provided it is dynamic enough) is capable of annihilating the dominance of the past *Karma*.” The term *Karma* here connotes the cumulative influence of the past deeds on the behaviour and life of the individual.
Behaviourism, Karma and Fatalism

It is surprising that the charge of promotion of fatalism against the *Karma* theory of Ayurveda comes from those who do not hold the human being volitionally responsible for any of his actions whatsoever—the behaviourists.

The school of behaviourism, by far the most popular with the modern sciences, believes that everything we say, do or think is not volitional, but a result of our automatic reaction to the individual hereditary, environmental and allied influences which inexorably condition our reflexes. It is the sequence and the pattern of the jumps of electric charges in our brain cells, triggered and designed by the respective and relevant situations and factors, that shape our actions and there is no ground for belief in the existence of an independent will of the individual.

It may be noted that behaviourism embraces all the characteristics of the *Karma* theory where helplessness, automatism and non-responsibility characterise the actions or the action-patterns of an individual. This is calculated to push forward the fatalistic approach to life far more forcefully than the totality of the theory of *Karma* which *squarely fixes the responsibility for action on the doer* who is not regarded as an absolute automaton, with no responsibility or will of his own as claimed by the behaviourist. The moral aspects and the inevitability of reward or of nemesis, whichever is deserved, for all actions, which goad an individual, held fully responsible for his acts, to greater endeavour towards nobler ends, find no place in behaviourism which appears to have opted for all the evils of the *Karma* theory-while totally avoiding all that is good, glorious, ennobling and elevating in it. Of course, human beliefs themselves are conditioned reflexes, according to the behaviourists. But if that view-point is accepted in its strictest and fullest measure, one is not responsible for anything one says and the audience is not responsible for listening to it.

In this context Arthur Koestler’s observation on the effect of determinism on morality is significant. He writes,
The word 'conditioning', with its rigid deterministic connotations, has become a key-formula for explaining why we are, what we are, and for explaining away moral responsibility. There has never been a dead horse with such a vicious kick.\(^5\)

The following passage illustrates the effect of this psychology on the attitude of modern medicine:

Medicine, this new comer among the natural sciences, in many respects, assumes the attitude typical of the new comer who wants to make one forget his lowly origin and becomes more intolerant, exclusive and conservative than the genuine aristocrat. Medicine became intolerant towards everything which was reminiscent of its mystical and spiritual past, at a time when its older brother, physics, the aristocrat of the natural sciences, was undergoing the most profound revision of its fundamental concepts, questioning even the shibboleth of science, the general validity of determinism.\(^6\)

And since the qualities of morality or propriety are entirely foreign to the concept of behaviourism, what shall be the status of behaviourism in the comity of sciences? Evidently, the same as that of any other pattern of automatic conditioned reflexes. The behaviourists cannot have it both ways. If one's thoughts and beliefs cannot have the status of well-reasoned concepts arrived at by a process of concentration of independent and intelligent thinking, nor can the thoughts and beliefs of the behaviourists claim to be in any way different in quality than those of mine. How can mere environment-generated reflexes claim the status of truth or reality? And who will decide the issue? The very nature of the behaviourists' stand precludes, for all time, any effort at verification of the validity of their concept or, for that matter, any other concept, since no judge or arbitrator or scientist is capable of thinking independently, for he cannot help acting as an automaton, being one, under the terms of the theory. Any decision he will take will be a result of a set of mechanical conditioned reflexes based on untraceable variables and
imponderables, and not of an intelligent weighing up of pros and cons.

Dr. Kenneth Walker, in *A Doctor Digresses*, ridiculed this theory of automatic actions shaped by the patterns of jumps of electric charges in the brain cells by describing an imaginary scene in which the behaviourist enters his room and starts arguing in favour of behaviourism, impelled by the jumps of the electric charges in his brain. This triggers another pattern of jumps in the brain cells of Dr. Walker which automatically propels his knee so as to strike the behind of the behaviourist in a way which, in turn, propels the behaviourist towards the door which leads out of the room. However, as a result of some less barbaric and more human environmental influences in the doctor’s past, a fresh pattern of jumps of electric charges in his brain induces him to change his hostile stance and makes him invite the behaviourist to his table to share a glass of wine with him and to talk sense!

Prof. Sigmund Koch of Duke University, USA, participating in a discussion on a paper, *Behaviourism as a Philosophy of Psychology*, read by Prof. Norman Malcolm of Cornell University, at a high-level symposium on BEHAVIOURISM & PHENOMENOLOGY (in the presence of perhaps the greatest behaviourologist after Watson, Prof. B.F. Skinner), while answering a question from a member of the audience, had made the following observation:

I would be happy to say what we have been hearing could be characterised as the death rattle of behaviourism, but this would be a more dignified statement than I would like to sponsor, because death is, at least a dignified process.7

This discussion on *Karma* and behaviourism can now end and the readers can choose whichever of the two concepts they like to guide their actions during their lives.

Religion

There is no calculated scientific foundation to justify or to generate Einstein’s firm belief in the existence of the till-then- undiscovered ‘unified field theory’. The belief was merely a
strong view based not on scientific but on aesthetic or religious considerations that there must be a basic unity behind all this diversity as the absence of such a unity will constitute a lacuna in the perfection and beauty of the pattern of the laws of the universe.

We could also put it in the following words: "Einstein held the belief that God or nature or the universal intelligence could not create a universe without at the same time creating a law or an equation which could simply apply to all the physical phenomena of the universe. Hence his search for the unified field theory."

It can be argued that we have no proven basis for such an assumption. But then, neither had Einstein a proven scientific basis for his assumption that an all-pervading applicability of a single universal law was an established, even if undiscovered fact. Its subsequent discovery or development by Schrodinger and Heisenberg can be taken to supply a scientific base for Einstein's belief. But that does not contradict or refute the assumption that his belief could have resulted from aesthetic and religious considerations.

The eminent thinker, Julian Huxley, looks at the phenomena of matter and spirit from a triple angle embracing science, art and religion simultaneously, a typical Ayurvedic stance:

The moulding of matter by spirit is, under one aspect, Science; under another, Art; under still another, Religion. Let us be careful not to allow the moulding forces to counteract each other when they might be made to co-operate.8

No medical science has co-ordinated and made the three forces co-operate better than Ayurveda has done. Modern medicine has certainly not made the slightest effort in the direction of seeking this kind of co-operation. What holds true for modern medicine holds true for modern science itself. Linn and Schwartz remark:

The man of science has finally come to ask himself whether his ideal is to be pure research or service to his fellow
man. The example of Nazi Germany especially has emphasized the fact that moral purpose and social responsibility must direct the search for scientific knowledge and the acquisition of power.\(^9\)

**Moral Discipline**

This is what Ayurveda has consistently insisted upon from the earliest times to this day. Only an Ayurvedic text could include *adharma* or *asat karma* (immoral or improper actions) among the causes of epidemics! To quote a passage from only one of many ancient treatises on Ayurveda:

When the leaders (*Pradhana*—leader, headman, ruler, president) of a country, city, town or village take to *adharma* in their dealings with the public, then the dependents, subordinates and flatterers surrounding them aggravate the *adharma*. Then that *adharma* eclipses the *dharma* (dutifulness, honesty, truth, religion) and that land becomes godforsaken.—*Charaka, Vimana III, 24-25.*

When greed and avarice, anger and wrath and pride and vanity, hold sway over people’s minds; they despising (*avamatya* = brushing aside, outvoting, despising) the weak, and irrespective of the victims being their own kith and kin, take to invading and destroying each other, or destroying others only, or getting destroyed by others. Thus begins the “epidemic of arms” (*Shastra-prabhava-jana-padodhvansana*—*Charaka, Vimana III, 26.*

*Charaka* says,

As the age of truth declines, some people find themselves in possession of too much (*adana*). This leads to *gaurava* (heaviness in body and lethargy in mind). *Gaurava* leads to *shrama* (sense of fatigue) which results in *alasya* (laziness). This leads to *sanchaya* (hoarding), hoarding to *parigraha* (taking what belongs to others) and *parigraha* to *lobha* (greed and avarice). This chain of demoralisation goes on through treachery, falsehood, uncurbed desire, anger and
wrath, vanity, hatred, cruelty, shock, fear, distress, sorrow, anxiety (abhidroha, anritavachanaiva, kama, krodha, moha, dvesha, parushya, abhighata, bhaya, tapa, shoka, chittiodvega), etc. Then the bodies and the minds of the people deteriorate and become a ready prey to disease. Thus even the span of life is lowered.—Charaka, Vimana III, 33.

Faith Healing

Just a quote on faith healing:

Whatever the explanation of the healing power of the medicine man or of the evangelist or of the holy water of Lourdes, there is little doubt that these agents often achieved a spectacular curative effect upon the sick, in certain respects even more dramatic than many of the drugs that we can analyse chemically and the pharmacological results of which we know with great precision.  

This item can end with a remark from the eminent thinker, Erich Fromm:

The analyst . . . as a physician of the soul . . . is concerned with the very same problems as philosophy and theology: the soul of man and its cure.

Treatment: Patient or Disease?

The fifth major difference between Ayurveda and the modern medicine is that whereas the latter attacks the disease directly and helps the patient through the destruction of the disease or the disease processes or the positive factors including infections that lead to the genesis of the disease, Ayurveda approaches the patient directly over the head of the disease and destroys the disease by a process of reinforcement or bolstering up of the resistance of the patient or the tissues invaded by the disease. It is not that modern medicine ignores the patient altogether while trying to save him through the destruction of the disease or that the Ayurvedic physician ignores the disease altogether while trying to protect the patient. Modern doctors do prescribe minerals, vitamins,
enzymes and other alternative and anabolic agents to raise the resistance of the patient to enable him to resist the ravages of the disease as also those of their powerful drugs with devastating side effects on the tissues of the patients. Conversely, the Ayurvedic physician also does use medicines which are not totally devoid of some direct action against the disease itself. But, by and large, modern medicine destroys the enemy, i.e., the disease, directly, to save the patient; and the Ayurvedic physician befriends the patient, adding to his own natural resources to fight and destroy the enemy, the disease.

Speaking against the isolation of the disease from the patient as a separate entity, Dr. Clarke-Kennedy remarks:

A moment’s thought reveals that no disease ever existed without a living man, woman or child to suffer from it, any more than a human mind as we know it, can exist without a human body and brain to maintain it.12

The following two case histories will clarify this point.

1. A highly anglicised Indian, an eminent Sindhi lawyer, who subsequently rose to the position of a High Court judge in a major state of India, well known (I would say, notorious) for his anti-Ayurvedic diatribes, often referring to the large doses of crude herbs as ‘horse doses’, ‘nostrums’, etc., had an attack of coronary thrombosis and was admitted to a major modern hospital in Bombay. He insisted on his removal to another hospital where the surroundings were more ‘western’ and the nurses white. Even as he was recovering from the heart attack satisfactorily, he suffered an attack of pyelitis with fever, burning sensation while passing urine and malaise. The pus cells in the urine rose to three hundred per high power field. The modern doctors brought them down to nil within seventy-two hours of treatment with an antibiotic.

The patient was a close personal friend of mine, in spite of his anti-Ayurvedic outbursts, as he was a man of great personal charm and integrity of character. We had fled from Lahore together during the holocaust of partition and were members of the same social and service clubs. When I called
on him at the hospital, he confronted me with the question, "See Panditji, the miracle of the modern wonder drugs? Within three days the pus cells in the urine disappeared completely. What would have happened to me if I had been made to swallow the Ayurvedic horse doses?"

Unfortunately, a few days later, while he was still convalescing at the hospital, there was a recurrence of pyelitis. This time even stronger doses of the antibiotic proved only partially effective. The increase in the number of antibiotics also did not completely remove the signs and symptoms. Larger doses and permutations and combinations of various antibiotics caused side effects which irked the patient. His family forced him to place himself under Ayurvedic treatment. It was eventually the 'horse doses' that rid him of the devastating side effects of the antibiotics and the b. coli infection of the kidneys.

2. The second case I wish to mention in this context has been described in the September, 1951 issue of the Indian Medical Digest under the caption, "A Case of Sub-acute Bacterial Endocarditis". He was a millionaire's son and a multimillionaire's son-in-law. The article in the Digest is written by an eminent doctor who, at the time of the treatment, was associated with India's all time great cardiologist, the late Dr. Rustum Jal Vakil. The gist of the article is that the patient was lucky to have been born during the era of antibiotics; and that, but for the advent of the antibiotics and the modern advances in cardiology there was not a ghost of a chance for the patient to survive.

The reprints of the article were distributed outside the medical profession, and found their way to the tables of eminent industrialists, politicians and administrators.

Within five months of the publication of the article, the patient had a relapse. This time the history of the first case cited above repeated itself. Higher doses and larger number of antibiotics only worsend the situation. The prognosis was described by the proverbial word—'grave'.

Again, at this stage, the patient was placed under the Ayurvedic treatment. He recovered completely and returned to normal life.
These two case histories, representing numerous ones of their type, have been given to bring to the notice of the listener and the reader, the following essential points:

(a) Although, by and large, Ayurveda is supposed to excel in diseases of degeneration as also in chronic conditions whereas the modern medicine is said to excel in diseases of infection and acute conditions, both these cases suffered from acute or sub-acute infections.

(b) The Ayurvedic medicines that restored these patients to health were probiotics as against the antibiotics administered by the moderns. The antibiotics could perhaps still kill the bacteria in vitro, even if they failed to kill them in vivo; but the Ayurvedic probiotics which cured these cases could not kill the disease producing bacteria in vitro, even if used in their highest concentrations.

(c) Since the probiotics merely extended protection to the affected tissues by raising both the general and the specific resistance of the patient against the infection, the treatment was directed at the patient and not the disease. Since no antibiotic action took place, direct attempt at killing the units of life, the bacteria, was avoided. This meant automatic avoidance of side effects and additional gain of side benefits.

No Side Effects

In the modern approach to infectious disease, the drug agent, of necessity, has to be a killer, the target of killing being a bacterium, a germ or a virus. The latter, quite often is too tenacious or too resistant to succumb easily to mildly lethal drugs. The strength of the bactericide or antibiotic has to be raised to such lethal proportions as the toughness of the infective agent demands. Sometimes this process results in the use of such highly toxic drugs as have a very deleterious effect on the patient's normal tissue components themselves.
Hence the development of a new speciality in modern medicine—the treatment of the iatrogenic disease.

We can therefore regard the absence of side effects in the Ayurvedic treatment as the sixth major difference between Ayurveda and modern medicine.

Servicing the Man

Before taking up the next item let us comment further on this aspect of Ayurvedic approach to human constitution. Servicing a man, a psychosomatic machine, even if we forget its *Adhyatmic* or spiritual component as non-demonstrable in a laboratory, is not the same thing as servicing a car. But a human being is a car to the allopath and a drug, not unlike petrol, is good for all and sundry. To the Ayurvedic physician, too, the man is like a car, but only in a limited sense, i.e., that he needs servicing. There the simile ends. For, the Ayurvedic physician services the humans at different levels—physical, psychic and spiritual. It is another matter that, for practical purposes, we rarely transcend the psychosomatic domain; thereby stopping short of a full-fledged three-pronged Ayurvedic thrust at the man’s deviation from the latitudes of normality in the three spheres of his being. Thus the servicing is personalized and individual—not only do the tissues have to be oiled and repaired, but the oiling and repairing has to be extended to the thought processes also. This, along with the spiritual repair, constitutes the special domain of Ayurveda. The great thinkers, Julian Huxley and Eric Fromm have underlined this concept in their respective statements already quoted above.

Psychosomatic Whole

The seventh major difference between the two systems is that the psychosomatic nature of disease is inherent in the Ayurvedic base of *Tridosha* which has already been explained elsewhere in this volume. The division between the psychic and the somatic disease is much sharper in modern medicine than in Ayurveda. From the very take-off of Ayurveda in the hoary prehistoric period, the psychosomatic and the *Tridoshic*
patterns have been inextricably interwoven to make a single pattern in which there is no place for a purely psychic or a purely somatic disease. Sushruta asserts that when a patient gets even a boil which, on the face of it, is a purely physical condition, he soon develops psychic overtones along with the physical symptoms, characterised by his individual mental approach with which he faces his problems. Modern science itself has come a long way in finally accepting the intimate connection between the physical and mental disease and is fast abolishing the apartheid which kept the two categories strictly apart for centuries until a few decades ago. As Franz Alexander aptly remarks:

Once more, the patient as a human being with worries, fears, hopes, and despair, as an indivisible whole and not merely the bearer of organs—of a diseased liver or stomach—is becoming legitimate object of medical interest.\cite{13}

Charaka's definition of medicinal agent, "nothing that exists is non-medicine", should be understood in the light of the Ayurvedic concept that any thought, experience or substance that brings about the slightest change in the body chemistry shall not leave the mind uninfluenced, and *vice versa*.

**Parallel Truths**

The eighth major difference between the two systems is on the concept of truth, regarded as one and indivisible by most moderns. We, the Ayurvedic physicians, feel that the view that truth has only one face is based on unfamiliarity with the multifaceted aspect of reality. In a confined setting of a single approach to disease, the modern concept works admirably. But when it comes to a vitally different angle of looking at the same picture, the concept of truth as consisting of only one approach fails to hold good—as in the case of an allopathic dose of opium which is aggressively costive and a homoeopathic dose of opium which is exactly the reverse, i.e., a cure for constipation. Of course, the constipation that the homoeo-
pathic opium cures has to simulate symptoms caused by a
gross dose of opium.

The means to induce anaesthesia are numerous and
some of them radically different from each other—chloro-
form, ether, hypnotism, intoxication, auto-suggestion, acu-
puncture, faith, determination and grit to go through it with-
out flinching, or samadhi (deep meditation). Here it may be
mentioned in passing that the experiments conducted at the
laboratories of India’s biggest medical institution—All India
Institute of Medical Sciences, New Delhi, by the eminent
Indian physiologist, Prof. B.K. Anand, in his study of the
phenomenon of samadhi, brought out startling facts that could
not be explained “scientifically”. He found that a normal
person could not keep his hand in ice cold water for more than
two minutes or so without the alpha waves of the EEG regis-
tering the shock to the nervous system. The experiment was
repeated on a yogi who showed the same pattern of normal
response. But after he had entered samadhi, i.e., a state of
deep meditation, and his hand was kept in the same low
temperature in water, there was no alteration in the alpha
wave pattern for fifty five minutes, beyond which period Dr.
Anand did not continue the experiment, perhaps to avoid any
possible damage to the tissues of the hand. The anaesthesia
induced by chloroform could have offered no more protection
from pain than the state of meditation had done. But the two
approaches remain fundamentally different and refute the
view expressed by some doctors that there can be no two or
more parallel systems for achieving identical results. Since
truth according to them travels along a single path, some of
them take up a stubborn and unrealistic attitude and persist
in declaring that chloroform and samadhi can be integrated
into a single compound.

In this context, it may be recalled that while giving you
the definition of upashaya or the therapeutic methods, the 42
permutations and combinations of salubrious use of drugs,
diets and practices (aushadha, anna, and vihara) prescribed in
different ways indicating contrary or similar approaches to
diseases and their causes have already been referred to. Ayur-
veda regards the different approaches as parallel truths which
do not necessarily contradict each other. In contrast, the
modern medicine, nature cure and homoeopathy take a very rigid stand in this matter as shown by the sharp utterances of their respective proponents in their speeches and writings.

**Standardisation: Chemical or Clinical?**

The ninth and the most important difference between Ayurveda and modern medicine lies in their different concepts of ‘standardisation’. This will require some clarification as some workers (those who twist and torture Ayurvedic concepts to distort their meanings until they can be interpreted or, rather, misinterpreted so as to be *absolutely* identical with the allopathic concepts) have taken up the parrot cry that Ayurvedic medicines must be standardised in the allopathic sense of the term and that otherwise Ayurveda shall not be acceptable as a “scientific” medicine. Acceptable to whom? Science is correctness and not acceptability.

In this context let us have a deeper look at the meaning and the purpose of the term standardisation. As it is used in modern medicine its meaning is strictly confined to the *chemistry* of the drug. It does not cover *uniformity of action on the patients*, unless a patient is a rat in a laboratory, which is not the case in clinical practice. If one labours under the belief that a chemically standard drug has a standard therapeutic action on every patient, he is obviously living outside the world of clinical practice and its day to day observable phenomena. Five grains of absolutely standardised quinine preparation can cause severe symptoms of cinchonism (giddiness, ringing in the ears, etc.), in one case. Another may swallow five times this dose without turning a hair. Explaining away this frequent and demonstrable *non-standard clinical* action of *chemically standardised* drugs by such terms as individual tolerance, allergy, anaphylaxis, idiosyncracy, etc., merely underlines the fact, stated above, that it is not truly practicable, realistic, and shall we say, scientific, to confuse chemical standardisation with the standardisation of drug-patient response. The patient is a non-standard, and unstandardisable entity. And so are his reactions to standardised drugs. His constitutional and metabolic reactions and responses which are subject to change on a number of factors need
continuous observation for correct manipulation and adjustment of therapeutic measures.

The Ayurvedic physician may be compared to a technician manipulating an amplifier controlling the pitch of the voices of different speakers, or the voice of the same speaker, before an assembly, when the speeches are recorded for replays. He lowers the pitch of the voice which is too loud and raises the pitch of the voice which is too low for the purpose of the sensitive recording apparatus. The standardisation of pitch in recording the voice is achieved through the agency of the amplifier since the standardisation of the pitch of voices of speakers, like the standardisation of the patient’s reactions to standardised drugs, is not a feasible proposition. In the latter case the role of the technician is played by the physician and of the amplifier by the tridoshic apparatus (concept) on the basis of which the therapeutic action is lowered or raised, i.e., weakened or intensified. The person who does not tolerate quinine is, in tridoshic parlance, vata-pitta prakriti (the VP type and the one who can tolerate large doses of this drug is kapha prakriti (the K type). By operating on the predominance, recession and the fluctuations of the doshic (over-all metabolic) balances, the drug-patient relationship can be brought to near standardisation in the same way as the varying pitch of the voice of the speaker can be brought to near standardisation by manipulating the amplifier.

Influencing Factors

There are a number of factors responsible for the differences in the metabolic patterns of different individuals or in the incessant fluctuations of the metabolism or metabolic balances of the same individual. Chief among them are the geographical, climatic, seasonal, racial, familial, behavioural, constitutional and dietetic factors and many others which cannot be taken up here as they are too numerous to be dealt with within the short compass of a single discourse. However, by way of an example, here is a very apt observation on one of these factors, namely, climate, by Boring:
An American soldier . . . . may think of siesta as a mark of indolence, typical of the lazy nations of the world. After he has lived a short time in a hot climate, he changes his mind. Human beings need to rest when it is very hot, saving their activities for the cooler parts of the day. A siesta is not a sign of laziness, but of common sense.¹⁴

Living Traditions

The attitude of the two systems differs on the subject of tradition. The Indian doctors consider Ayurveda as a traditional and allopathy as an anti-traditional system, although there are a number of modern doctors who do not subscribe to this stance. To those who describe the traditionalists as dead to the present, the Ayurvedic physicians, in using the benefits of the traditional system for the suffering people with demonstrable success, wish to convey that in case of vital and undying traditions it is not the living who are dead but the dead who are alive. One other feature to which attention may be drawn is the wider applicability of the Ayurvedic remedy (of course, within the prescribed ambit of the doshic, i.e., specific metabolic) patterns than that of its allopathic counterpart. For example, chloremphenicol cannot be prescribed for malaria nor quinine for typhoid fever. These two specifics cannot be given to a patient of tuberculosis, nor streptomycin in cases of the two former diseases. But the Ayurvedic remedies, sudarshana churna, nimbadi churna, guduchyadi kwatha, etc., can be safely prescribed in all these cases without any fear of the disaster that would occur in the case of the patients of the three fevers mentioned above if their allopathic remedies were switched from their exclusively specific uses. Not that there are not broad-spectrum antibiotics or allied remedies in modern medicine. But their ambit is more restricted than that of the usefulness of the Ayurvedic medicines, even if they are not as quick-acting as the antibiotics or the bactericides and need additional support of synergistic agents to activate them more effectively.

Effect of Food

The Ayurvedic belief in the effect of the nature of foods consumed by an individual, on his mental faculties, attitudes and
morals may also be mentioned in passing. According to Ayurveda, the nature of food has definitely something to do with the propensities of the mind. History bears witness to the fact that it was never a horde of vegetarians that indulged in the burning of cities, mass slayings and mass rape. We may recall here a question which was asked by an American as to why Mr. J.C. Kumarappa, a staunch follower of Mahatma Gandhi, made use of violent language when writing against the British at the time of the Quit India Movement. Gandhiji had replied with a smile, "You should make provision for his Madras diet which is full of chillies and hot spices." I need hardly point out that Mahatma Gandhi's humour was never inane or pointless. It always carried a message.

Of course, in taking a stance on the quality of food one chooses for consumption, the fact cannot be overlooked that in avoiding the diet that involves killing or torturing of other creatures, or creatures nearer to man, or the flesh of man himself, the decision of the mind that leads to such a choice, already reveals an innate compassionate nature which pre-exists. This, in Ayurveda, as also in Yoga, is the important factor called the sanskara. Sanskaras, in the final analysis, are the over-all collective corpus of mental and psychic traits as distinguished from the purely physical traits of the individual. Naturally, they involve the background which stretches back into not only the physical past consisting of generations (theoretically, including even the Darwinian concept of the ancestral species extending to the anthropoid apes and even beyond), but also the past actions or karmas as the ancient Ayurvedic seers have viewed the phenomena. However, as already stated, all this does not deflect from the desirability and potentiality of the effort or Purushartha, enlightened man's only instrument to fight the dominance of karma.

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The word ‘history’ denotes and can be applied to every aspect of human activity. The etymology of the word hardly helps us in arriving at a definite meaning. It is derived from the Greek and Latin words meaning a narrative, account or story. A reference to the lexicons is not any more helpful, as the meanings, definitions or explanations given therein range from ‘a narrative of events connected with a real or imaginary object, person or career, especially such a narrative devoted to the exposition of the natural unfolding and interdependence of the events treated’, to ‘a systematic written account of events, particularly to those affecting a nation, institution, science or art and usually connected with a philosophical explanation of their causes.’ It is also defined as the branch of knowledge that records and explains past events as steps in human progress and as the study of the character and significance of events. Thus history becomes a narrative of events, personal careers or ideas linked together in one; or the career of nation, institution, science, art and religion linked together—explaining the causes and factors of their progress or decline; or it becomes simply annals (from annus=year) and chronicles (from chronos=time) in the proper order. The term ‘history’ was used by the Ionian philosophers (6th century B.C.) to connote the search for knowledge in the wider sense of the word. It included the results of enquiry and investigation but not narrative. Two centuries later, the ‘historios’ or reciter of stories superseded the seekers of knowledge or the historians.

The word ‘history’ appeared as ‘historic’ in the fourteenth century. ‘Historic’ is anglicised directly from the Latin ‘Historia’ a history. The Latin word is derived from the Greek
word 'Historia' or 'Istoria' meaning a learning by inquiry or information. The words 'histon' and 'histor' meaning learned are derived from the root 'Eidenai' to know; Eidenia comes from 'id' to know. The main root of the word is 'Weid' to know. It is interesting to know that the root 'weid' (has a family likeness to the Sanskrit root 'vid' to know. The Sanskrit term for history is 'Itihasa' meaning 'Iti'=thus, Ha= certainly and asa=it was so Itihasa=thus it certainly was or happened to be.

But the sum and substance of all these definitions and explanations seems to be that history is a revelation of man's nature in action and intelligence.

Moreover, with the recent inauguration of the discipline of history as a regular science, it becomes incumbent on us to study the growth of the very concept of history first, before commending the study of history of all departments of knowledge from a really scientific point of view.

With the gradual evolution of historical times and memory it took shape as an anecdote, tale, narrative or account of a single event, life or period. In the next stage, it became a regular record, memoir, annals, chronicles, archives or recital or register of tales, myths, legends, traditions, Puranas, etc., emphasizing or eulogizing particular persons, facts or events. The account of the whole life career of a person, became 'biography' and it was termed 'autobiography' when the person himself narrated the full story of his life. On further progress history included the description of the evolution of a whole dynasty, tribe or race. It extended its scope to include the whole of the epoch-making periods at a stretch e.g. ancient, mediaeval or modern period of any one branch of human activity in a country, such as religion, philosophy, politics, economics, culture etc., thus establishing not only the shape and value of that particular subject, but its proper place and significance in the total context of life history. Thus the history of each subject linking the past with present revealed, by means of its tendencies, the future possibilities of the nation or the race in that direction. Such writing of history was haphazard and confined to a few men and nations.

In the last century, history assumed a scientific form when writers took the universal view comprehending all subjects
with reference to all time and all space, and arranging history from a global point of view and in one picture, in its proper evolutional perspective. And today history recounts events with meticulous scrutiny and due discrimination, depicts their relative values, mutual relations, their importance to the whole of humanity without racial or national bias or pre-possession derived from interest of self, family, tribe, nation, race or religion. History now, completing its covert and limited life of the embryonic stage enters upon its overt and universal life of its global stage, thus inaugurating the science of history.

And with the commencement of the scientific era of the discipline of history, medicine has seized its opportunity to look back upon its past from the universal point of view and has endeavoured in right earnest to depict the history of medicine with a scientific outlook and to re-establish its rightful place and value in the totality of human evolution.

Since 1905, the year when the Leipzig Institute was founded by Carl Sudoff, nearly every university has introduced the subject of medical history in its pre-clinical, clinical or post-graduate course. Thus medical history is now taught in almost all the countries of the world. Social research Institutes, Libraries and museums and laboratories for the advancement of this branch now exist in the main cities and Universities of Europe, the United States and Canada. Chairs for the History of Medicine have been established in many places. An International Society of the History of Medicine is holding its sessions at different places trying to co-ordinate work accomplished in different countries during different periods. Bulletins, magazines and journals on the subject are being published from various countries. And to link the results of all these efforts in one unit and set it rightly in the total perspective of the Universal history Dr. Sigerist has undertaken the colossal task of writing the world’s history of medicine.

In fact, in the history of medical education, it must be recognised that the history of medicine is not altogether a new subject. For, in India, the history of medicine both in its legendary as well as historical aspects was the first lesson propounded in the medical text books. In the West too,
it formed a part of the medical syllabus up to the beginning of the nineteenth century, when it was difficult indeed to become a doctor of medicine without a knowledge of medical history, at least of the life and work of Hippocrates and Galen. The outlook in such a study was more of the acceptance and utilization of the medical practice prescribed by these ancient masters.

But with the rise of modern scientific medicine when materialism and positivism became dominant, when an economic and a commercial outlook reckoned money higher than knowledge, when epoch-making discoveries revolutionized the methods of medicine and surgery, when mechanical contrivances, technical methods, laboratories and radiography multiplied enormously the data and details of every subject, the modern student became over-burdened with the details in the study of these daily increasing materials and was unable to look beyond or behind the present moment. Hence at the University level the subject of history was omitted from the medical syllabus. An imperfect acquaintance, or more often absolute ignorance of the past made the student believe that no discoveries were ever made except those pertaining to modern times. When the medical history was thus ignored in the medical course, it was but natural that to the lay public it remained a terra incognita. But periodic recurrence is the characteristic phenomena in the evolutionary spiral of both man and the universe who are the microcosm and macrocosm respectively. Cyclicity and rhythm are the laws of life. These laws apply equally to the evolution of medical thought and are thus a clue to the rhythmic thought, tides that have swept the shores of human inquiry from age to age. This has happened in the study of medical history too. After the ebb of a century, the dynamic flood of study of medical history was started in force and historical thinking has been considered now a fundamental requisite for the student of medicine. This wave standing on the shoulders of previous experiences and surrounded by an environment of scientific spirit commands a wider prospect about it; and man will not bow blindly to everything that is old and time honoured or modern and new angled but will select and gather with the discriminating eye of Science, facts
and figures, i.e., statistics, in trying to formulate a universal setting for the history of medicine.

In this respect, here is an ancient adage which says:

Not all things old should one uphold,
Merely because they are old,
Nor from all poesy new,
Should one's approbation withhold
For those that choose the better are the good;
Men discriminate wise and bold,
It is indeed the thoughtless prude,
That's led by views that others hold.

Man studies medicine firstly as history and then as medicine. This scientific method has brought into his ken a new and fascinating fact that medicine has played a very great part in the shaping of the political history of man. Medical history is, in the words of Victor Robinson, the greatest of stories, the record of man's conflict with credulity. Medical history not only widens the mental horizion of the medical man, but also serves as a standing beacon to warn him against future errors, groping, fumbling or falling into blind alleys, in the study and investigation of disease and its remedies.

With the advent of the new scientific era in the field of history, medicine attains an exalted and all important role in the drama of the evolution of the culture and civilization of man. Culture is the real representative and the cumulative outcome of the scientific accomplishment of an age. And the medical profession is the mirror that reflects accurately the image of the cultural progress of the race in any age. No other profession has a like opportunity to come into such close contact with the somatic and psychic tendencies and habits of men and women in their daily life.

Being a friend, guide and sympathetic counsellor in health and disease, the physician can understand the individual, family, community and the nation much better than the members of other professions. Moreover, no other profession can claim a history so full of discoveries so immensely beneficial, which have alleviated human misery and have helped in the survival of the human race. Hence the history of
medicine in its universal and most comprehensive aspect deserves a dignified place in the history of the culture and civilization of mankind.

It has been well said that the proper study of mankind is man. But mankind owes its very existence to the preventive and curative science of medicine which saves it from total annihilation by the onslaughts of diseases and the rigours of climate. As a humanistic study, medical history is of even greater importance than the history of wars, religion, philosophy, etc. It is the most fascinating story, the record of man's conflict with ignorance and disease; it is the living story of culture in its gradual manifestation and it is the real story of man and how he survives and evolves from stage to stage. It gives a better, clearer and more comprehensive picture of the whole history of civilization and of the cultural evolution of man.

The history of Medicine, is thus both history and medicine as expressed significantly by Dr. Henry Sigerist. As history, it must show a chronological order and the dates and definite periods of the great leaders and teachers of medical thought and practice. As medicine, it must represent the gradual unfolding of ideas, from the most primeval beliefs and fancies. It must be a gradual or a radical transition from stage to stage of medical concepts, of the discovery and utilization of the treasures of plant, mineral and animal products, and the systematic and ever-widening study and observation of the processes in the human organism in health and disease. Are we in a position to compile and present to the world such a regular and comprehensive picture of the history of medicine in India?

The answer, to our great regret, is negative. The reasons for such a situation are many and varied. The foremost of them is, that medical history is a part and parcel of national and regional history. Thus, unless the facts of chronology and of the political and cultural history of India, are fully established, it would not be feasible to attempt a similar portrayal of the medical part of Indian history. However important medicine, science and philosophy may be, each one of them is but an aspect, of the total life of a people, and is the offshoot and a tributary of the whole national or racial life.
The difficulties that are met with in any attempt at writing a regular history of the evolution of medicine in India, have been fully considered by Castiglioni in his great volume of the History of Medicine, in the chapter dealing with Persian and Indian medicine. To the most authoritative historians of India, nothing is certain before 326 B.C., the invasion of Alexander, or at any rate before the seventh century B.C. i.e. the time of the Buddha. It is admitted by historians, that much of the material such as inscriptions, stone-tablets and the relics in excavations, still await unravelling by expert investigators while the sole source left to them at present, is the evidence of the literary and religious texts of the Vedas, the Brahmans, the Puranas and of lay literature.

There are peculiar obstacles in the way of ascertaining the chronology, names and biographical details of persons who have played important roles in the evolution of the history of India in general and of her medicine in particular. Max Muller writes with reference to the history of Philosophy in India thus and this applies to the history of medicine with equal force.

From the actual works themselves, written by the poets, philosophers and scientists of India, very little material is to be had, pertaining to the life and work of the author. Most often, even the name has to be learnt, from the colophons or such other appendages to the original, contributed by the editors, commentators and such others. The difficulties in computing the dates are augmented by the prevalence of different eras in vogue in the various parts of India.

Again the country has been subjected to waves of foreign invasions and depredations from time to time and much valuable material in the form of literature, edicts, inscriptions, paintings and other art-forms have been lost or destroyed. This state of affairs is even more accentuated where Ayurveda is concerned. Much of the old literature of the various branches of medicine has been lost, and successive waves of invasion and foreign domination of India have cast the achievement of her medicine into the limbo of oblivion. Thus for over fifteen hundred years now, Indian medicine has suffered stagnation and decay. Very few, if any, efforts have been made by either Indian or foreign scholars to
connect the loose ends of medical history and progress and evolve a continuous record of the evolution of Indian medical thought and practice. While on the other hand, a blind sentimental exaltation of the past, led to an unquestioned acceptance and adoration of whatever was called ancient medicine, and prevented a thorough and enlightened inquiry and scientific scrutiny into its claims. Some others, taking a wholly superficial view and being repelled by its seemingly queer methods and concepts, rejected it as holding no validity for modern times.

It is no wonder that under such circumstances medical historians have almost ignored the part played by India in the evolution of the medical science of the world. In the absence of accurate historical data there has often been a distortion of the facts resulting in blunders thus evincing the shocking ignorance of even learned authors:

It is difficult to state with any degree of certainty at what time medicine reached such a remarkable state of development in India.

The celebrated Indian physician Mahabharata thought that the works attributed to Atreya and Sushruta date at least from the time of Homer (C. 900 B.C.). Others are of the opinion that they flourished about 600 B.C. (Medicine Throughout Antiquity—Benjamin L. Gordon).

Berdooe, the author of the origin and growth of the healing art says:

Charaka, whom we may term the Hindu Hippocrates, flourished in Banaras, probably 320 B.C.

It is not, however, our purpose to overburden these pages with a recital of the many sources from which material for a history of medicine in India could be gathered; nor do we suggest that so far scholars have not attempted such a task in some measure or other. We feel that if these sources are more fully explored with an eye to finding material for medical history, they will throw adequate light on the state and evolution of medicine in India from the earliest times,
going back to the pre-Aryan civilisation of the Indus Valley and thus afford an opportunity for joining scattered data together to make a complete study.

We hope thus to reclaim much territory for history which is now covered by the mists of picturesque legend and myth. It is interesting to note that Castiglioni in his volume on the History of Medicine remarks that “India offers all the attraction of a large and marvellous museum in medicine as in other fields, the magic practices of the primitive people, the cult of stones and trees, the belief in amulets and charms, the periodeuteis or travelling physicians and ambulant doctors of Greek description, the scholastic, pedantic, dogmatic and the most modern type of specialists are all found in actual active practice shoulder to shoulder. All the stages of evolution of the science of medicine from instinctive, empirical, magical, priestly, religious metaphysical and scientific practice, thus all the stages of evolution of medicine are represented in this country.” This will give an important link to connect the various stages of medical growth of the whole world.

Despite all that we have said and hoped for the purpose of chronology, we have no landmarks to guide us in our sallies into the ancient history of medicine in India, beyond the invasion of Alexander and the time of the Buddha calculated from the former date. As we shall see later in the course of these pages the great medical teachers Bharadwaja, Atreyya, Divodasa and Sushruta are much anterior to the Buddha and even the time of the Mahabharata. Though we may not assign exact dates to these teachers and their times, we shall yet indicate the successive order of the periods they occupied, in the light of the racial and traditional history of the Indian people.

Medicine is as old as the instinctive avoidance of pain and since this repugnance to pain is an innate characteristic of life, it may be said that medicine is co-eval with life itself. Thus the medical historian, if he is to begin from the beginning must needs go back to the very origins of life. But obviously, so vast a theme is beyond the scope of the written word and indeed of the human intellect; and we can only exclaim with the Rishi Dirghatamas of the Rigveda;
Who beheld life, when it first arose? Life, that formless in itself, fills all forms.

From earth are fashioned blood and breath but whence the spirit that informs these?

Who has gone to the ultimate Knower of all things to put the question?

Who verily knows and who can here declare it, whence it was born and whence comes this creation? The Gods are later than this world’s production. Who knows then whence it first came into being?

Modern science which has sifted the atom in the universe and drawn its dragnet through immensities of siderial space is no wiser when it comes to the primal birth-mystery of life. The only difference and it is a vital difference—is that, where the ancient seer saw in the emergence of life the fulfilment of a divine plan, the man of science is aware of an accident merely—an accident so irrelevant in the cosmic context of its occurrence, that it can have no bearing on the scheme of things. To the modern scientist, then, no less than to the Vedic seer the first appearance of life and intelligence upon this planet remain the twin mysteries of creation.

Ayurveda which is concerned with both these mysteries is inclined to view them as having had no beginning in time and thus the question of when and how life and intelligence came into being, is discountenanced. Says Atreya,

There was no time when either the stream of life or the stream of intelligence did not flow.

He then goes on to argue that as life has thus existed throughout all time and has always been aware of itself, it follows that Ayurveda which is but the tradition embodying this knowledge, has enjoyed an antiquity as immense as life itself.

The knowledge of healing therefore, has come down as an eternal tradition but an eternal tradition does not mean an immutable tradition. To Atreya who takes the dynamic view of reality, the whole world is being reconstituted every
moment. Knowledge is no exception and we have already noticed he refers it as a "Stream".

Thus the continuity of tradition which Ayurveda has enjoyed is the continuity of growth not of mere survival. There is nothing in it of the "closed dogma revealed once for all to the saints" and admitting of no further modification. On the contrary Atreya explicitly declares that Ayurveda has no limits and that it is capable of indefinite expansion.

He exhorts the student to be diligent in the acquisition of knowledge from whatever source available, since to the intelligent man the whole world is his teacher.

It is impossible as already mentioned to trace this continuity of medical tradition to its source. Reason and revelation no less than sorcery and superstition have contributed to its flow, which taking its rise from what mysterious well-springs we know not, has run parallel to the very stream of life. It carried the silt of age-old superstitions, it is not also luminous with the light of the spirit?

Whether we believe with the ancients that medicine has descended from heaven, being a gift of the gods, or with the moderns that it has slithered up its way from the abysmal coze of superstition and only now stands blinking in the sun, depends on our view of the origin and destiny of human life. Certain it is that it has shared the same cradle as life and is destined to the same immortal end. The Charaka Samhita in common with the other ancient works recalls the tradition of the heavenly descent of medicine. Since it maintains that the science of life has co-existed with life, this can only mean that in his pursuit of healing, man has received heavenly guidance from time to time. One such occasion was the bestowal of Ayurveda by Indra, the chief of the gods, on Bharadwaja who had been deputed to bring it down to earth by the assembly of sages who met on the auspicious slopes of the Himalayas. This constitutes the beginning of the historical era of medicine. The circumstances attending this bringing down of Ayurveda to earth by Bharadwaja as related in the introductory part of the Charaka Samhita are worth recalling. It is said that when diseases first seriously assailed the lives of righteous people, the merciful sages taking pity on them met together on the auspicious slopes of the Himalayas to find out
a way to overcome these impediments in their pursuit of the
good life. The book mentions several of these sages by name and
it would seen that this first historic assembly was representa-
tive of the wise men not only of India but of the greater India
of that day and of the neighbouring countries. The assembled
sages after much deliberation decided that help could come
only from Indra, the king of the immortals, who had received
the science of life from the divine Aswins. But who was there
so enterprising, determined and ready enough to seek out the
king of the immortals in his celestial court and obtain from
him the science of life? There was an uneasy silence when
this challenge went round and it was sage Bharadwaja known
for his mighty austerities, who at last, breaking the spell,
offered to go on the great quest.

How he meets the king of the celestials in his resplendent
court and having received from him the coveted lore of life,
returns to the waiting sages, makes picturesque reading in the
Charaka Samhita. The science of life or Ayurveda thus enters
its earthly career and to sage Bhardwaja goes the credit of
first promulgating it on earth. But, 'first' here means as
already pointed out, first in that age or epoch, for Charaka
is emphatic on the point that the science of life is without
beginning and has existed for all time. When we read the full
story of this descent of Ayurveda to the earth as described in
Charaka, the following facts are easily seen to characterise
the historical truth regarding the systematic emergence of
medical science even in that far off day of antiquity in our
history. And one is not very surprised when one remembers
that the spirit of that age was one of dedication to truth and
logic, the very foundation of Science.

1. In that age, there took place a great conference of
learned sages of India and of the neighbouring lands in order
to find out a solution for the serious problem of disease which
had assailed humanity then.

2. On finding that the necessary knowledge for combating
the situation could be had from a far away land, they planned
to depute a worthy member to acquire the much-needed
wisdom.

3. Bharadwaja who stood up offering to undergo the tribu-
lation of travelling for and acquiring the science was chosen.
He returned and described it before the select gathering of the sages. Though they were satisfied with the great message of hope and relief, being practical men, they first put it to the test by actual experimentation on themselves as well as on others. When they were assured of the practical efficacy of the science they accepted it as a system.

4. They then invited six outstanding scholars to classify and compile all the data pertaining to drugs and disease collected in various parts of the country and to embody them methodically and systematically in one complete treatise. When these six compilations were ready they were placed before a committee of select judges. They decided that Agnivesa’s compilation was the best of them. They declared it before the world as the authoritative text of the medical science.

5. This is the first historical record, perhaps in the whole world, of systematising medical knowledge—knowledge that had come down, till then, as a living tradition traced either from a divine origin or from the findings of the deep thought and meditation of sages or from the instinct, experiment and experience of generations of humanity.

This in brief is the story of Ayurveda in its transition from its legendary to its historical epoch and we shall content ourselves now in tracing its mundane history as it passed from master to pupil and from the learned men of each age to their successors.

Pre-Vedic and Vedic Periods

Though in all matters Indian, both religious and lay, the Vedas are the sources of all enlightenment; India was peopled by races claiming a high degree of civilization even before the entry of Vedic Aryans from the North West. Before the recent discovery of the ruins of Harappa and Mohenjodaro, it was held that a relatively uncivilized race of people whom the Vedic Aryans called the ‘Dasyus’ were inhabiting the land. But there are indications of a highly developed urban civilization in the north as well as in the Deccan and South where the Dravidians lived and built towns and temples and were learned in the arts of agriculture, carpentry and smithy while the
Vedic Aryans entered the North West of India as a nomadic race.

The archaeologist has not yet fully unravelled the data available in the excavations of Mohenjodaro so as to enable the historian to identify or differentiate the civilization it represents with either the Dravidian civilization or with Assyrian and Babylonian ones which obtained along the same latitudes in the West beyond India.

To whatever race the Mohenjodaro civilization belonged, it was certainly pre-Vedic in its date and in its general characteristics. It was a highly urbanised life that constructed the broad streets, the drains, the baths and the place of public pleasure. From the medical historian's point of view, the high sense of sanitation that the lay out of a town with drains, baths and parks indicates, is remarkable and presupposes a sense of hygienic and medical values. The presence of mineral pitch and other drugs warrants the conjecture that they had, so early in history, a knowledge of the (preventive and curative value of) mineral drugs.

It would not be strange that as the Mohenjodaro culture used mineral drugs some people suppose that it was Dravidian in its origin. For the Dravidian culture that spread in India, before the entry of the Vedic Aryans owed allegiance to the cult of Shiva and the worship of the phallic *linga*, which later on absorbed by and incorporated into the Vedic culture. The Shiva cult is associated with its medical counterpart of the Siddha system of Medicine which is mainly therapeutics. Mercury, Sulphur, Iron, Copper and Gold as well as Bitumen, white, yellow and red arsenics and other minerals as well as vegetable poisons are the pharmacopia of the Siddha tradition which is pre-Vedic and Dravidian in its origin.

The stronghold of Dravidian civilization was in the South in the Deccan south of the Vindhayas and in the plains of south India. It was connected with Ceylon by a narrow stretch of water. They were probably connected by sea-routes with Egyptian and various civilizations on the coast of the Mediterranean. Since no records of that civilization are available except the highly prejudiced accounts of it given in the traditions of the Aryans themselves; we shall try to construct its probable picture from this very hazardous evidence.
The Ramayana certainly refers to a condition of national life and Aryan colonisation when the Aryans had not spread beyond the southern regions of the Ganges and certainly not beyond the Vindyas.

When Rama in his exile traverses through the intermediate wilderness and reaches the Deccan, he confronts colonies and towns where the so called Rakshasas held sway. These Rakshasas allowing for all the exaggeration of a hostile and highly poetical fancy, were powerful in war, rich in their style of living, possessed chariots, and armies, wore elaborately wrought ornaments, crowns and robes and precious raiment. They had their armies, statesmen and physicians. They were addicted to wine drinking. Ravana, the chief of them was a highly learned and refined monarch, powerful and obstinate and had defeated in battle many kings and even the gods and had taken into captivity their fair women. His statesmen and counsellors were learned in all the arts and the sciences.

Again Rama found allies in the Deccan to help him regain his wife from her abductor Ravana, in the King and people of Kishkindha known as the Monkey people. Both Vali and Sugriva, the brothers and rivals to the throne of Kishkindha were learned and had extremely learned and wise counsellors like Hanuman and Jambavan. Sushena is the name of the famous physician of the Monkey King. When on the battle field, Rama and Lakhshmana fell unconscious being injured by the arrows of Ravana's generals, the monkey general flew to the north to the Himalayas where the life reviving herb grew and carried it to the battle field. The monkey physician revived the Aryan heroes and healed their wounds with these medical herbs. Except for the Himalayas, the Deccan and the south of India have the wealth of herbs and minerals in India.

The pre-Vedic civilizations of India yet awaits the searching gaze of the scientific historian but there can be no doubt that Vedic Aryans met beyond their immediate surroundings of Dasyus or uncivilized wild tribes, civilized groups of people well organized into towns and kingdoms and in many ways far superior to themselves in the arts of war and peace. The civilizations of the Indus Valley and the Deccan and the
southern plains of the peninsula will one day provide much material for the general historian as well as for the historian of Medicine.

Some scholars are even of the opinion that the Mohen-Jodaro and Dravidian civilizations are the creation of the earlier group of Aryans who arrived in India some 4000 years before the present Aryans entered India.

The Vedic Period

The Aryans for all matters, both lay and religious, the Vedas are the sources of knowledge and enlightenment. Ayurveda has been even considered as a sub-part or Upanga of the Atharvaveda. As we find this Veda full of medical subjects although the Rigveda also contains many medical reference to justify the belief that it is the main source of Ayurveda. Ayurveda signifies the science of life. The title Veda denotes that this knowledge has attained the dignified status of a Veda or science and that it has become a branch of learning held in as great an esteem as the four Vedas. The latter looked to the cure of psychosomatic ailments. The title also suggests that sanctity was attached to the science and it was of great antiquity.

Instinct is the inner compulsion that the animal organism feels in the choice of what is good and beneficial for its survival and protection. In early man, this grew into the higher faculty of the mind called intuition. The propounders of Ayurveda thus knew that the protective power and device was ingrained in life itself and acquired varied expression in the plant, animal and man according to the exigencies that each of these stages of animation gave rise to. The plant developed its thorns and a thick coat of bark to prevent its easy vulnerability. Animals and birds knew by instinct what particular action or thing helped it to get over an affliction. And equally naturally did early man see with his mental eye the measures and things that relieved him of ailments. In Charaka, we find it expounded that there never was a time when Ayurveda did not exist, even as it was the case with life. The life stream carried in its current its own supporting and protecting wisdom, that became manifest at the beginning of
each cycle of time to the seers. It is only in that that Ayurveda can be said to have a beginning. Otherwise it is as beginningless as life itself and runs parallel to it through all time. (Charaka Sutra 30, 27). The Veda thus naturally contains reference to such instinctive and intuitive origins of medicine.

Osler, the great writer on modern medicine refers to (1) natural phlebotomy which the hippopotamus knows, for it thrusts itself against a sharp pointed reed in the river bank when it feels it needs phlebotomy, (2) the use of emetics by the dog, (3) the use of enemata by the ibis. Berdoe refers to the use of vaelwian by cats, antidotal herbs for snake poison by the mongoose, of Plantago major by the toad, of salt by the cow, buffalo, horse and camel. Similarly licking the wounds by the animals, stopping the bleeding by monkeys and other instinctive performances of remedial gestures and applications by animals and birds have been noticed and described by writers on the history of medicine. The Atharvaveda mentions the animals and birds from whom the use of healing herbs and drugs could be learnt.

The boar knows the plant; the mongoose knows the remedial (herbs); what ones the serpents, the Gandharvas know, those I call to bid to aid for him, 23.
What (herbs) of the Angirasc the eagles know, what heavenly ones the Raghatas know, what ones the birds the swans, know, and what all the winged ones, what herbs the wild beasts know—those I call to aid for him, 24.
Of how many herbs the inviolable kine partake, of how many the goats and sheep, let so many harbs being brought, extend protection to thee, 25.

The natural desires and inclinations of the ailing man are even now indications of his needs not to be disregarded by the attending physician. Sushrutha is emphatic on the value of such inclination known as Prakranksa.

Man learned the practice of medicine at an early age in his development by watching the curative powers of nature, and the practices of animals and birds. He saw his dogs and cats using various herbs as emetics and purgatives; he noticed a
mongoose, after being bitten by a snake, counteract the poison; spiders chewing the leaves of the *plantago major* as an antidote to poison, and knew that the wild goats ate dittany when they were shot by the poisoned darts of hunters. Cornelius Agrippa knew of these practices among birds and animals and stated in one of his philosophical works that: "The sick magpie puts a bay leaf into her nest and is recovered. The lion, if he is feverish is recovered by the eating of an ape. By eating the herb dittany, a wounded stag, or goat, expels the dart out of its body. Cranes medicate themselves with bulrushes, leopards with wolf's bone, boars with ivy; for between such plants and animals there is an occult friendship." (*The Physicians throughout the Ages*, Vol. I).

In the simple society of those days the medical needs of people must have also been much less than in later times. We find that herbal medicines only were used and the Vaidyas used to plant the herbs in grounds attached to their houses or to fetch them from jungles where they grew widely. From the very beginning a sort of sanctity was attached to the practice of the healing art. The administration of medicine was accompanied with the recital of mantras for the appeasement of the God supposed to be responsible for the ailment. It must have aided the action of the medicine by implanting faith in the patient's mind. This mixture of religion and medicine is accounted for by the fact that the Rishis were the fountainheads of this knowledge in those days. The Rishis retired from the world and the quest of knowledge became their sole purpose of life and the imparting of it to disciples their only social duty. The religious association may be said to be responsible for making the practice of medicine a philanthropic mission, a characteristic which attached to it until very recent times.

Vedic medicine and post-Vedic medicine too have been guided in a great measure by what is known now as the doctrine of signature. The colour, texture or shapes of things that were similar to the affected parts or elements of the body were indications to them, of their usefulness as remedies and as replenishing agents. Thus substances that could tinge the fluids bright red were helpful in promoting the blood or in checking haemorrhage. Milk and other substances of its
colour and consistency, were regarded promotive of the body elements of similar texture and colour like semen, and ojas or the protoplasmic cell-fluid. Osler mentions the use of plant eye-bright for centuries in diseases of the eye, because the black speck in the flower suggested the pupil of the eye. Charaka mentions lac as beneficial in haemoptysis. The Atharvaveda mentions turmeric and yellow birds into which jaundice is charmed to enter, leaving the human patient.

It is from such beginnings, that man guided by the instincts of the lower animals and the intuition of the best among his own species, has evolved the present complex system of the healing science, harnessing fancy, imagination and reason in the service of health and life.

With the awakening of his mind to the super-sensual reality behind life, he felt the need to propitiate by conduct and ceremony, the mysterious powers behind life in the form of gods, spirits and angels. Thus the Atharvaveda is a record of the psychosomatic technique of healing by a combined procedure of charms, prayers, incantations, amulets and drugs. The Atharvaveda is a compendium of medicine in its various stages of evolution and contains the most primitive as well as highly advanced stages of therapy. A hymn recounts the four kinds of remedies or therapies that protect life. The therapies of holy chants, of the juices of plant and animal parts, of devotion to gods or nature therapy and of human contrivance by means of drugs are therapies that protect life.

O life! when you are propitious, the drugs of the Atharvanas (charms), the drugs of the Angirases (juices of plant and animal parts), the divine drugs (prayers to sun, water and other natural elements) and the drugs of human artifice, all bear fruition.

Thus even so long back as the Vedic times, man knew medicine in its various aspects of psychotherapy, organotherapy, naturopathy and drug therapy.

Snake-poison and other kinds of poisonous bites by the fangs of cruel animals were common in those times as the charms and drugs against these conditions are most common in the Atharvaveda. Toxicology, as a special branch, had
already come into being, with the Atharvans as a class of persons learned in charms and incantations against poison, sorcery and toxic conditions.

The combined therapy of drug and incantation was applied to somatic ailments as well; the fever, the king of them all, was known as Takman which yielded to both drug and charm, each singly or both combined.

As regards the surgical and therapeutic skill, the physicians of the gods, the Aswin twins, were wonder workers. They could replace the head of a man with that of a horse. They healed the withered hand of Indra after he wielded thunder against his foes.

The Aswins who are the physicians of the gods are celebrated as the resuscitators of sacrifice, for it is they, that reunited the severed head of sacrifice. It is these two again, that successfully treated Pusan when his teeth had become loosened, Bhaga when he had lost his eye sight and Indra when his arm had become stiffened. These two, moreover, cured Soma, the moon-god, of consumption and restored him to his happiness, when he had fallen from his state of good health. When Chyavana, the son of Bhrigu, had become decrepit with loss of voice and body-lustre, as the result of old age, but hankered still for sense pleasures, it is the Aswin pair, that made him young once again. On account of these and many other miracles of healing, these two, the greatest of physicians, came to be regarded with honour by such great personages as Indra and others.

With adherence to the mode of sacrificial worship, the anatomy of the higher animals like the cow, sheep and horse were well-known to the ancient Aryans. Though not often, even human sacrifice was practised which must have yielded a reasonably vivid picture of human anatomy. Wars with the rival tribes and clansmen on the north west of India and with the dark chieftains of the natives Dasyus must have necessitated the acquisition of a degree of surgical skill.

A thorough investigation of the material in the Atharvaveda from the medical historians point of view, remains yet to be
accomplished. There are 114 hymns in it, devoted to medical topics. Fever, consumption, various wounds such as Apaci, Vidradhi, etc., leprosy, heart disease, headache, worms, eye and ear diseases, poison, rheumatism, madness and epilepsy are some of the outstanding subjects mentioned in the Atharvaveda.

Even a cursory perusal of it is enough to conclude that a considerable knowledge of psycho-somatic medicine and a practical knowledge of human anatomy and surgical skill had been obtained already among the Vedic Aryans. It is from such beginnings and on such foundations that the later sages, researchers in the vital science of Ayurveda, eight branched and three propped, evolved a medical system. Complete with its framework of general principles of the science of the human organism and of the five elemental composition of drugs and the human cell controlled by the triad of forces called Tridhata.

Suffice it to know now that from this period of Vedic medicine we enter upon, the variegated scene of the Samhita period or the period of systematic and scientific compilation. The story of Ayurveda as scientific medicine begins after this quaint age of the Vedas, when the mortals and the immortals mingled and interchanged their gifts, when gods, spirits and demons were every day realities and when the Yaksas dwelt in running brooks and waving tree tops and the Gandharvas haunted the valleys and dells of the mountains. In such circumstances of living, naturally enough, the priests and physicians were one, and religion and sacred ritual were not far distinguishable from the healing art. At the end of this Vedic age must we place the great congress of sages described in the opening lines of the Charaka Samhita, who gathered to discover the way of healing and long life, faced with the undeniable reality of deadly disease and pestilence that snatched away the flower of humanity and made impossible the higher progress and evolution of life through meditation and thought. With that conference in the northern Himalayas, dawns the age of scientific medicine in India. The history of that medicine, the story of its beginning and unfolding, we shall trace in broad outline in the following pages with the limited resources at our disposal.
Charaka and Sushruta stabilised the floating mass of medical knowledge of the time and supplanted all other works if they were at all extant. Charaka's and Sushruta's could not have been the first written books in medicine as the art of writing was known long before their time. But the reason why we do not come across any book on the subject prior to this date is that these masterpieces eclipsed all other books which gradually disappeared altogether.

These two memorable works appear at about the end of what may be called the golden age of Indian culture. This age may be roughly said to be from 2000 B.C. to 200 B.C. During this period the true scientific spirit was abroad in the land. The quest for knowledge had taken different directions. Philosophy, astronomy, mathematics, trigonometry, music, administration, were among the branches of knowledge whose foundation was laid in this period and also considerably developed. There were Universities like the well-known ones of Takshashila, Banaras and Nalanda for dissemination and exchange of knowledge. There were great Acharyas (professors) of different subjects and those who keenly desired to learn at their feet travelled long distances like true devotees of Saraswati and sought their Ashrams. During this period of intense intellectual activity it is but natural that the science of life and healing should attract the greatest attention. Ayurveda is a product of that golden age of Indian history. The Charaka and Sushruta collections prove that a vast amount of scientific research, patient investigation and experimentation must have gone before the conclusions embodied in them. These must have covered a very wide range as the vast country provided a variety of climate and geographical conditions. We have altitudes ranging from 0 to 5 miles. We have almost rainless regions to those with 500 inches a year. We have the coldest and hottest possible regions. We have six clear cut periodical seasons each producing its distinctive vegetation. All these climatic and geographical variations affected bodily condition and its reaction to attacks of disease and to different kinds of medicines. The country with such enormous variabilities of climate and with such wonderful ranges of mountains as the Himalayas, the Vindhyas and the Ghats was a rich nursery for the growth of
all kinds of species in the vegetable kingdom. It provided a vast field for botanical research. Thousands of medicinal herbs or their products growing in diverse parts of the country in different climates are mentioned in Charaka and Sushruta. Diseases peculiar to different localities and seasons find a place in these books. There is no doubt that they represent not a local system of medicine but one which was recognised throughout Aryavarta (India).

The advent of Buddhism in Indian history had its effects on all walks of life. The humanitarian religion of Buddha laid more stress on their application for the welfare of mankind. During the period 323 B.C. to 642 A.D. in which the country tasted the best fruits of Buddhist culture, the academic progress of Ayurveda was well maintained. Valuable additions were made to its literature. The most notable book was that written by Nagarjuna. It was an extension of Sushruta bringing that classic up-to-date. But the remarkable thing about this period was that organised efforts were made to make the science as widely useful as possible. Medicinal herbs were planted along the sides of public ways to be made free use of by all. The idea of hospitals originated first in Buddhist India. The art of nursing which was included by Charaka along with the four essentials of proper treatment received its due recognition at this time and was systematised. Medical help became a part of the duties of religious organisation very much in the same way as it is with Christian missions in modern times. With the Buddhist missionary went the reputation of Ayurveda and of Indian culture generally beyond the bounds of India. The nations of the then civilized world, Rome, Greece, China, were attracted towards this land and students came from these countries to learn the sciences and arts which flourished here. The medical systems of Greece and Rome bear unmistakable signs of the influence of Ayurveda on them. India was considered the seat of learning at that time and many philosophers and scholars visited India for study just as we go to Europe or America today. Veterinary science also began in this period. Nagarjuna laid the foundation of Rasa Shastra and a number of pharmaceutical preparations of Rasa medicines i.e. mercury,
sulphur and other metals and minerals as well as poisons were introduced in treatment.

It is therefore natural to surmise that the time of Atreya coincides with that in which the general tendency in Indian life and thought became irrational, when inquiry into the original causes of things was initiated and pursued i.e. in the Upanishadic or the Brahmana period, that succeeded the age of revelation and intuition to which the Veda belongs. Thus in the heyday of Indian speculative thought, Atreya taught his elaborations of the theory of drug and disease and ushered in the age of scientific medicine. He gave it the framework of a metaphysic of medicine, a basement of theroy that could sustain the elaborate edifice of pathology and therapeutics so minutely evolved and completed at a time when humanity in general was still cradled in its infancy as regards scientific thought and practice. Succeeding the glowing demi-god Bharadvaja, who brought down the beneficent lore from the king of the gods, Atreya stands supreme among the teachers of the science of life among men, a teacher conspicuous for his sweet reasonableness, breadth and comprehensiveness of wisdom as of vision and clarity of definitions, and above all, expert in the correlating of drug to disease. He is thus the originator of scientific medicine. Atreya is a name immortal in Indian medicine and will remain so as long at the science of life is studied and practised in the light and spirit of his principles and basic theory.

His attachment to reason and the happy results flowing from scientific understanding as against fads and unreasoned faith which make for ignorance, is borne out by his exemplary description of the scientific concept.

Scientific concept

All these methods, rules and regulations and the meticulous study of logical postulates aimed at one thing and that was to make medicine a scientific structure of practical utility.

These facts clearly bear out and are certainly convincing enough that the ancients had developed and maintained a high standard of theoretical science and practical art of the medical profession; and when one reads:
The whole of suffering which cleaves to the mind and body has ignorance for its basis and (conversely) all happiness is founded in clear scientific knowledge. However, this very knowledge of mighty import is no illumination to those who are devoid of understanding; as is the orb of the sun to those who have lost their eyesight . . . .

One comes to the conclusion that a vital essence of success or failure of the medical profession depends upon one factor and that is whether medical knowledge is purely scientific or otherwise. If it is scientific, it will lead to happiness and success; if it is unscientific it will bring misery and unhappiness. Added to this when we read the following aphorism (translated) showing the importance attached to the study of the whole as against the part, our heads bow down with veneration to these Maharishis. A full conception of the science will never be attained by the knowledge of only a part of it.

The physician therefore was required to be fully equipped for such clinical tests, to be sound of judgment and to be keen in his sense-perceptions. It is no wonder that with such meticulous elaboration of the methods of examination, the physicians of India were famed in the past for their skill in diagnosis and healing. This medical glory of India was at its zenith during the time beginning with the period just preceding Buddha until the 8th century A.D., when the physicians of India were invited to Jundishapur and Baghdad for consultation and were put in charge of the hospitals. Its highest achievement was during the period of Asoka when the culture of India was carried across her oceans to the south, and the mighty mountains and the table-lands to the north. The greater India of that day including Tibet, parts of Java, Sumatra in the East and extending up to Bactria and Persia, almost up to the shores of Greece, in the west, was built not by military conquest, not by invasions and commercial exploitation but by the devout and humanitarian priests and missionaries who carried the sacred words of knowledge and the means of healing, both spiritual and physical. That is an
ideal that India of ancient times pursued without laying herself open to the charge of imperialism and exploitation in the wrong sense. Hers was the imperialism of the spirit and of knowledge whose empire knew no bounds, not even of time and space, and transcended the distinctions of race, colour, and religion. In a word her domain was the heart and soul of man i.e. of all mankind and she built it up with all the strength at her command.

From the second century onward we find an increasing interest in Raskriya, pharmaceutical chemistry. During the following six centuries this study developed into a regular science which was incorporated into Ayurveda.

The next important authority in Hindu medicine after Charaka and Sushruta was Vagabhatta of Sind, who flourished about 7th century A.D. His treatise called Astanga Hridaya which while presenting a summary of Charaka and Sushruta with gleanings from Agnivesha, Bhela, and Harita, brings the subject up-to-date. He introduces a number of new drugs and makes valuable modifications and additions in surgery. He did all this in spite of strong opposition from the orthodox school. Astanga Hridaya classified the description in 6 sections. It contains 7,444 verses in 120 chapters. The whole book is in verse.

He also wrote another work called Ashtanga Sangraha. Vagbhatta’s style is very clear and concise. He throws light on several obscure passages in his predecessors’ works. Vagbhatta was subsequently considered as great as Charaka and Sushruta. A popular couplet gives him the place of honour in Kaliyug, just as Charaka and Sushruta had it in Krityug and Dwapara respectively—

Atrih krityugey vaidyo dwaparey Sushruto mataba
Kalow Vagbhattanamachama garimacha pradushyatey

A poetic but an impressive way of recognising the merits of this great man. Among the students of Hindu Medicine, the three are known by the name of the Vriddha Traya—the Senior Triad.

During this century also Ayurveda attracted the attention of Arab scholars and its leading books were translated into
Arabic. It may be said in general that the Unani system of Medicine which the Arabs evolved was to some extent founded on Ayurvedic knowledge gained from India. The Indian Unani system never lost touch with its parent and subsequent Muslim penetration into India led to their growth side by side not as competitors but as colleagues.

Coming nearer to our times we meet with the name of Madhava or Madhavacharya who wrote several works embracing almost all branches of Hindu learning. He was born in Kishkindha now called Golkonda in Southern India and was prime minister to Raja Vir Bukkan of Vijayanagar in the 12th century. In his medical work named Madhava Nidana he dwells exclusively on the diagnosis of diseases. He has treated the subject so well that his authority on this branch of medical science is held to be indisputable. There is a couplet on the tip of every Vaidya’s tongue which means: Madhava is unrivalled in diagnosis, Vagbhatta in principles and practice of medicine, Sushruta in surgery and Charaka in therapeutics.

It contains 1,552 verses in 69 chapters.

In his old age Madhava became an ascetic and assumed the name of Vidyaaranya (Forest of learning).

During the Mahomedan period, i.e., upto the 16th century, activity in Ayurveda mainly ranged round Raskriya. Systematic works were written on the subject by Chakrapani and Vrinda. Narhari Pandita and Madanpal wrote two masterpieces on medicinal herbs, viz: Raja Nighantu and Madanpala Nighantu. Sarangdhara, the son of Damodara, in the 14th century systematised materia medica as a whole and is still a most popular and reliable treatise on the subject. His book contains 2,500 verses, is divided into three parts and has 32 chapters. The Sarangdhar Samhita, Madhava Nidan and Bhavaprakasha are regarded as the Laghu Trayya or the Junior Triad. During this period the importation of Unani and European medicines into Ayurveda began.

The next celebrated writer on Hindu medicine is Bhamishra, the author of Bhava Prakasha. This physician lived in the sixteenth century A.D. (1,550) and was considered to
be the best scholar of his time in Medra Desha in North-West of India and was called: "A jewel of physicians and master of Sastras." In his work he summarises the works of previous authorities. The lucidity of his style and the excellence of his arrangement show how clearly he grasped the subject. He ably explains many controversial passages of ancient writers. His work is the last authoritative book in Ayurvedic literature. It is highly esteemed by Vaidyas in all parts of India as an invaluable compendium of Hindu medicine. It is considered a medical Thesaurus. It contains 10,831 verses and it is divided into three sections. Its style is simple and is delightful to read. In the time of Bhavamishra, India had commenced to come into contact with the European nations, notably the Portuguese who were attracted by great possibilities of trade. A syphilitic disease, in which hands and feet were affected, was common among the Portuguese. Bhavamishra deals with this—affection at length under the same name of Firanga Roga i.e. Foreigner's disease. The absence of any Sanskrit name for the disease, and the name (Firanga Roga) given to it, would suggest that it was introduced into India by the Portuguese who were foreigners to India. Bhavamishra describes three stages of the disease, namely, Bahya (external), Abhyantara (internal) and Bahirantara (external-internal). He says that the disease, in the first stage, is curable. In the second stage when the joints become involved the cure is doubtful. While in the third stage, when it has spread both externally and internally, the affection is altogether incurable. One afflicted with malady becomes lean and weak, his nose sinks, his gastric fire becomes dull and his bones become dry and crooked. Mercury is recommended as a specific remedy. Bhavamishra was the first to make mention of certain medicinal drugs of countries other than India. For instance, he mentions:

- **Badakshani Naspasi** i.e. Amrita fruit of Badakshan
- **Khorasani Vecha** i.e. Acorus calamus of Khorasan
- **Sulemani Kharjura** i.e. Date fruit of Suleman.

Bhava Mishra was an inhabitant of Banaras where he is said to have had no less than four hundred pupils.
Bhava Prakash is the last important Ayurvedic book we know of. After this there is no evidence of any further progress in Ayurvedic science. Indian civilisation had long passed its meridian. Vital institutions had degenerated into meaningless forms. Originality had vanished. Indian culture ceased to be progressive. Ayurveda suffered the same fate as other branches of learning. The Ayurveda of today is as it was during Bhavamishra's time.

There is a parallelism between the development of Ayurveda and the Western science of medicine. The Greek period about 1000 B.C. may be the best time of classical Europe just as the Vedic time was in India. In 460 B.C., Hippocrates of Cos, who is called the father of medicine collected the medical knowledge of his time and gave it in the form of aphorisms for greater facility in memorising it just as Charaka did in India. Later, during the Roman ascendancy Galen of Pergamus wrote in A.D. 131 another classic just as Sushruta did here. There is a similarity in the styles of both. Detailed descriptions based on experimental work or on personal observation characterise the writings of both of them. In the 4th century Oribasius of Pergamus in A.D. 325 wrote books presenting Hippocrates and Galen in popular form just as Vagbhatta did in the case of Charaka and Sushruta. After the 7th century western civilisation suffered a set-back and there was a general decline in art and science. In India this state of things was to come some six or seven centuries later. There was a revival of learning in Europe from the middle of the 16th century. The Greek and Latin classics were rescued from being totally lost. Their study was revised and they were translated into all the European vernaculars. But the revival of ancient learning alone would not have sufficed to raise European genius to the heights of progress which it subsequently did. It was Lord Bacon who saved it from stagnating in the bogs of scholasticism and set it on the road of experimental science which it is still pursuing, and finding it ever expanding before it, and created great men in all branches of science: and the science of medicine made rapid progress in each of its branches, e.g. Anatomy, Physiology, Surgery, Midwifery, Radiology, Bacteriology, etc.
Spread of Western Civilization in India

With this new spirit Western Civilisation spreads its influence in India. With the establishment of British rule, Western institutions began to be introduced. Among them was the Western system of medicine. It was a modern science which was just organised and put on a practical and scientific basis, which relied more on reason than on faith, which was progressive and had hundreds of martyrs working all over the world to do research for the benefit of humanity. They established medical schools and colleges which simplified medical education. The distribution of hospitals and dispensaries all over India facilitated the practice and spread of it. Conversion of medical practice into a lucrative profession attracted the best intellects of the country to it, and registration maintained the dignity and standard of the profession.

English became the medium of education and the educated Indian was introduced to Western literature and science. Being fed on them the educated Indian began to look down upon the indigenous systems of Medicine. Ayurveda having thus lost patronage of the educated classes and the state reached the nadir of its decline.

Organic life when it ceases to grow begins to deteriorate. This is also true of human institutions. As long as they are progressive they are vitalising but when they cease to be so they degenerate into dead forms and traditions. A sort of mysticism gathers round them. Ayurveda has to some extent met with such a fate. There was no check or control over its practitioners and anybody who could not find an engagement elsewhere took to this profession, their stock-in-trade being a facile tongue, abuse of doctors and a few medicines.

Lack of registration allowed any man in the street to call himself a vaidya follower of Ayurveda to the extent that it became proverbial among people to say that:

The best profession is agriculture, next is business, the lowest is service and worst is begging. But if you fail in all these you better practise medicine.

The number of such practitioners is so large that it is
impossible to know a genuine exponent of Ayurveda from a counterfeit one. Such people naturally want to make a mystery of that which is really a mystery to them. They claim infallibility for Ayurveda of which they are ignorant. It is a sign of the exhaustion of a people’s genius to claim finality for its best achievements. The practice of this noble science has fallen to some extent into the hands of charlatans. Many evil results followed their ignorance and their attempts to hide it. For example, this *pseudo-Vaidya*, a product of this degenerated, period ever tries to exploit the credulity of people. Charaka recommends an eight-fold examination of a patient for diagnosis of his disease but the *pseudo-Vaidya* gets attuned to the malady of the patient by simply having a look at him or any of his relatives even. Wonderful medicines making the old young, imparting inexhaustible virility etc., exploit the vicious nature of man and are excellent money-making devices but are hardly calculated to convince thinking people. Ayurvedic medicine required preparation which needed accurate knowledge and experience, which took time and taxed patience. These so-called *vaidyas* had none and so they started purchasing ready-made stuffs of inferior quality from unscrupulous businessman, and thus Ayurveda and its medicine gradually lost people’s confidence and therefore its popularity. Then there has been disruption of authority. Where every man can constitute himself a *vaidya*, he becomes a law unto himself. He recognises no superior whom he would consult as a superior man or even as an equal. Ignorance is ever intolerant. The *vaidyas* not only disliked the doctor but were jealous of him. In the hands of such people it became an instrument for extorting money. Thus there was total anarchy so to say in the Ayurvedic field.

It became like a noble edifice fallen into ruin by the very weight of time. Its roof had gone. It was fully exposed to inclemency of weather. Rank weeds have grown around its wall, cobwebs fill the space within. Pilferers have not failed to remove slabs boldly from the dilapidated mansion. It is from such a sorrowful plight that Ayurveda has to be resurrected.
The Renaissance

In the beginning of this century India awoke from her long slumber. She awoke to the realisation of the value of her heritage in art, literature and philosophy. The study of Sanskrit by Western savants, by the Royal Asiatic Society and other bodies and men of learning and enlightenment was in a great measure responsible for this renaissance. As a result of the impact between her age-old culture and the new forces of modern thought from the West, India became conscious of her mission and special contribution to the world in the matter of thought, way of life and spiritual ideals. The inadequacies of modern scientific mode of life and thought became gradually evident and the people of the west themselves realised that mere scientific achievement was going to lead mankind nowhere. The literature and philosophy of ancient India is full of inspiration for the moral and spiritual uplift of man. The emphasis is all on the psychic and spiritual aspects i.e. the unseen in man. As medicine is an integral part of the sacred literature of the Vedas, the scholar's and researcher's eye fell on that and one after another beginning with Max Muller right up to Sylvain Levi and Jean Filliozat, these scholars of the West and our own learned Pandits, Vaidyas and historians of Philosophy like Radhakrishna, and Dasgupta discovered the unique achievement of India in Medical thought and practice. Indian medicine has since been the subject of study of many orientalists like Zimmer, Julius Jolly and other famous savants.

As a part of the new national awakening which demanded political emancipation there arose also the desire for resuscitating the age-old systems of medicine and for adjusting it to the new conditions. Consequently year after year conferences were held for the upliftment of Ayurveda and the persistent demand for such a revival persuaded even the British Government to open schools of Indian medicine and give some degree of encouragement to Indian medicine. But the help given was nominal and the encouragement given was half-hearted and niggardly.

With the achievement of independence, the people of India desired more than ever to revive the age-old system of Ayur-
veda and by methods of modern research to interpret it in
terms intelligible to the modern world and wherever necessary
import new trends into Ayurvedic treatment and drugs with-
out endangering its basic structure and pattern.

The New Impact

Once again with the impact of western science and modes
of life, India has had to rise to take up a new and powerful
challenge. But we all know how during the last half a century,
India led by her great spiritual giants like Tagore and Gandhi,
has fully established her right to cultural and political sove-
reignty. In the realm of medicine which is a vital part of that
cultural sovereignty, India stands on unshakable foundations.
She can not only meet the challenge of the west, she can even
annex the territories of the aggressor.

The new synthesis that is contemplated will show the
nature of India’s annexation of ‘modern medicine’. India’s
medical science is broad-based and so well and deeply founded
that its need have no fears of being washed away by these
currents from outside. Besides, her powers of absorption and
assimilation are like the capacity of Agastya who could sip
up the seven oceans. That is her magic genius for synthesis.
She is the philosopher, par excellence, that knows how to
assort the facts of science and create a frame-work for
life, give direction and motion to the stagnant waters of mere
facts and data. She has the irrigational genius that can turn
the wasteful waters of the wilderness into life-giving streams
feeding the vital sources of life. India today can and has to
meet the new challenge and give to the world the new synthe-
sis, a remedy for the ailments of the general man not of India
alone, and rectify the omissions in the efforts of the European
Renaissance, omissions born of Europe’s ignorance of India’s
contribution to the science of medicine.

The success of this endeavour and the universal good that
is to flow from its achievement is no longer a matter of doubt.
There can be no failure in such good and rightful efforts.
These are efforts that have been tested on the touchstone of
science and their validity is universal.

This synthesis is for the benefit of the universal science of
medicine; and the men of the neo-Hippocratic school in Europe have already begun the work in a way that makes our task easy.

In this new endeavour nearly all the States have developed Colleges for Ayurvedic Education. Many Universities now conduct the graduate course in Ayurveda. Two universities have recognised the post-graduate course as well. The Planning Commission has formed an Ayurvedic panel and appointed an Honorary adviser in matters relating to Ayurveda. The Indian Government’s Ministry of Health has appointed an adviser in the Indian Systems of Medicine, established a separate department for this work and formed the Central Council of Ayurvedic Research. Ayurvedic Pharmacies are making rapid progress. Philanthropic people are donating large sums of money for the revival of Ayurveda.

Research Institute

In 1946, the Government of India appointed a Committee under the Chairmanship of Colonel R.N. Chopra to go into the whole question of these systems of medicine and to recommend steps that should be taken to improve the facilities for research and training in them and generally to increase their usefulness to the public. This Committee recommended that a Central Research Institute in Indian Medicine should be set up immediately to supervise, conduct and co-ordinate research into various aspects of indigenous medicine. In 1949, another Committee under the Chairmanship of Dr. C.G. Pandit was appointed to follow up the recommendations of the Chopra Committee and to work out and submit to the Government a detailed scheme for the development of a Centre of Research in Ayurvedic and Unani systems on as broad a basis as possible utilizing modern scientific methods in their study. In this way the results obtained will be understood and accepted by all concerned.

Location of the Institute

In selecting the location of the Institute, the Pandit Committee was guided by the following considerations, viz: the
nature of accommodation that would be available to the Research Centre, either separately or in association with an existing Institute, facilities for further expansion, library facilities relating to both the indigenous and modern systems of medicine, the presence of a herbarium, the presence of a department of pharmacy, and, if possible, proximity to a modern medical institute or hospital well equipped with laboratory facilities. After reviewing the facilities available at various existing institutions in the country, the Committee unanimously came to the conclusion that the proposed institute should be set up at Jamnagar in association with the Gulabkunverba Ayurvedic Institution. This Institution, under the patronage of the erstwhile Maharaja and the Maharani of Jamnagar, had already established a certain tradition in research in Ayurveda. In the hospital attached to it, there was at the time an "Ayurveda Chikitsa Vibhag" with 50 beds where Ayurvedic physicians and physicians trained in modern medicine had been working side by side. Furthermore, the Institute had an excellent library and laboratory facilities and there was plenty of room for expansion. In the opinion of the Committee, a proper atmosphere prevailed in Jamnagar in which the proposed institute could function most efficiently.

In accordance with these recommendations, the Government of India established the Central Institute of Research in Indigenous Systems of Medicine at Jamnagar in the year 1953.

Given below are a few words of Pandit Jawaharlal Nehru during his visit to the Institute:

"This is a fascinating inquiry going on in this research institute and it may well lead to very fruitful results. The so-called conflict between Ayurvedic and modern medicine has to be studied and resolved. The only right approach has to be the one of science that is of experiment, trial and error. In whatever type of medicine we may deal with, we cannot profit by its study unless we apply the methods of science. In this way there should not be many conflicting methods but various aspects of one scientific approach. Nothing should be taken for granted. Every-
thing should be tested and proved and then it becomes a part of scientific medicine—old and new.

JAWAHARLAL NEHRU
Nov. 2, 1955.

The Institute in Jamnagar is the first of its kind. The spirit of co-operation and friendliness which permeates the work of the Ayurvedic and Modern teams is a worthy example which could be profitably adopted in wider spheres of activity. In this Institute have been laid the foundations of a vital experiment, the results of which may have a far-reaching influence not only on the future course of Ayurveda but also on modern medicine. A new and vigorous system of Ayurveda may emerge out of this study; new and powerful remedies and newer concepts of health and disease may be discovered enriching and enlarging the broad front of medicine. But before the ultimate objects can be achieved, there is a long and arduous path to traverse. The goal can only be reached through patience and perseverance and strict adherence to scientific methodology at all times.

A post graduate training centre was added to the Research Institute in 1956 and students from all the States of India were selected for admission. This post-graduate training centre has sent out in the whole of India more than two hundred scholars; they are rendering useful services in the educational and research Institutes of the States.

The Post-Graduate Institute of Indian Medicine (Banaras Hindu University 1963)

The recent establishment of the Post Graduate Institute of Indian Medicine in the Banaras Hindu University is another meritorious milestone in the history of the progress of the Renaissance of Ayurveda. Banaras is the holy place on the shores of the sacred Ganges. The sages of the hoary past selected this inspiring land for establishing the famous University of Kashi; and the Royal-Surgeon Divodas (Dhanvantari) developed there the great school of surgery. With this memorable tradition, Pandit Malvijai established the Banaras Hindu University and there in the stimulating atmosphere of sanctity
and *Samskar*, Ayurveda is sure to be restored to its pristine glory.

There are two centres of higher education and Research in India at present viz. one at Jamnagar and the other at Kashi. It is interesting to note that Jamnagar, due to its brilliant contribution in education and culture, had since long earned the appreciative appellation of *Chhota Kashi—Kashi the minor*. Thus the word *Kashi* continues to be the hall-mark for ardent endeavour and incessant industry for the growth and development of scientific knowledge that would fulfil the sublime purposefulness of human life.

Some more institutes of Research and post-graduate training are to be established in the very near future. The Renaissance is still taking shape and it is hoped that by the work of these Institutions Ayurveda will emerge as a world science whose benefits will be available and utilised not only here in India but all over the world. Ayurveda is cast, by its original propounders, the great sages Bhardwaja and Atreya, in a universal mould and today, with the efforts of these research centres, it is on the verge of fulfilment as a world science of healing.

That the greatest medical system of medicine—Ayurveda, the marvellous production of this noble and immortal civilization, should still remain a sealed book to the greater portion of mankind is no credit to modern western civilization which is mainly the product of Greek civilization. The two greatest civilizations of the world—the Greek and the Indian—are simply the two branches of the primary Aryan Civilization. The remarkable Aryan race early separated and sought their fortunes in different countries. An Eastern or Hindu, and a Western or Grecian branch early distinguished themselves, and formed great nations having characteristic peculiarities. Each raised its country to the highest ranks among nations in arts and sciences, and promoted, in a particular manner, the progress of the Science of medicine. Both distinguished themselves by their intellectual endowments, which at an early period, shone forth with the greatest vigour, and produced the richest and almost abundant fruits in philosophy and science, medicine and ethics, literature, civilization and
government, and in all that dignifies and ennobles the human race.

These two sister civilizations stood separately for centuries and each witnessed ups and downs. Now scientists have shortened the distance of time and space and brought them again in close contact and historians have brought the past and the present nearer and connected them in one link and the time is not far when both will be one again.

Some interesting points to note:

1. Alexander advised his soldiers to take treatment from Indian physicians specially for poisons and snakebites.
2. Alexander took with him some Indian Physicians.
3. Alexandria University was established after Takshila University.
4. Export of Indian drugs was to such an extent that Rome had to put a customs barrier for Indian drugs.
5. Missionary medical work was started by Buddhists in B.C. Period.
6. Nursing was given equal importance in Ancient Indian Medicine. Buddha is considered the greatest nurse.
7. The Hospital system was started in period before Christ by Buddhist missionaries.
9. Indian Physicians advised registration of Hakims and stopped quackery in Baghdad.
10. Indian Physicians were invited to Baghdad, 7th-8th Century A.D. and some were put in charge of the Hospitals.
11. Akbar called an international medical conference in Delhi.
12. In the eighteenth century English surgeons came to see Rhinoplasty operation performed by an Indian Surgeon in Poona.
13. The Malaria—Mosquito established as carrier of malaria by Ross in Hyderabad and Ross was awarded the Nobel Prize for this discovery. He wrote the famous verses on the next day of discovery:
This day relenting God
Has placed within my hand
A wondrous thing; and God
Be praised, at His Command
Seeking His secret deeds
With tears and toiling breath
I find thy cunning seeds
O million-murdering Death.

14. Plague or Haffkine—Haffkin Institute, Bombay.
15. Relapsing fever—Carter, 1892, J.J. Hospital, Bombay.
16. Small-pox—Dr. Choksi, Arthur Road Hospital, Bombay.
17. Cholera—Dr. Koch in Calcutta.
HISTORICAL BACKGROUND OF AND
INTRODUCTION TO AYURVEDA

M.L. DWIVEDI

It is a well-known fact that Ayurveda is one of the oldest scientific medical systems in the world. The history of the origin of Ayurveda starts almost from the beginning of creation. The desire to keep fit and live long has been represented even in the basic instincts of an organism. Ayurveda in this respect has set the pattern for other systems of medicine and has more or less provided the basic framework of most of the systems of medicine in the world.

It is universally accepted that the Vedas are the oldest written record of the knowledge which our ancient sages and seers acquired. The period of the Vedas, even according to modern historians, dates back to about 10,000 years B.C. The Rigveda, the oldest among them all, contains many concepts of Ayurvedic fundamentals like Tridosha or Tridhatu. Several diseases and their treatment have also been mentioned. References to transplantation of organs and reference to an artificial limb having been fitted on to queen Vishpala, wife of king Khela, is also found. Though almost all the Vedas contain references to Ayurvedic concepts, but the Atharvaveda contains ample references of concepts of Ayurveda, so much so that Ayurveda is considered to be the Upaveda of the Atharvaveda. Here we find the references to anatomical and physiological discussions, pathological progress of diseases and their treatment and other systemic knowledge about Ayurveda. The Atharvaveda deals also with philosophy and psychology and psychosomatic concepts and psychiatry as a whole. Later on, between 700 and 1000 B.C. Ayurveda was fully developed into eight recognised branches, or specialities and two prominent schools, namely:
(a) Atreya Sampradaya (School of Physicians)
(b) Dhanvantara Sampradaya (School of Surgeons).

In the school of physicians, Punervasu Atreya, the disciple of the sage Bharadwaj, was a very prominent figure. He established a school and used to arrange seminars on various topics of medicine. He had six prominent disciples who compiled six separate Samhitas on medicine. Agnivesha was one of them who compiled Agnivesha-Samhita which was later on re-edited by Charaka and Dridhabala. This Samhita is known at present as Charaka-Samhita and is considered to be an authentic book of Ayurvedic medicine.

Similarly the school of surgeons was initiated by Lord Dhanvantari, who, legend has it, was a disciple of Indra himself, and was king of Kashi. The word Dhanvantari also means 'expert in surgery.' Therefore this school began to be known after the name of Dhanvantari. There were many disciples of Dhanvantari, of whom Sushruta was the foremost, who wrote many treatises. The treatise written by Sushruta is known as Sushruta Samhita. This is still considered to be an authentic book of surgery in Ayurveda. There was also a school of pediatrics headed by Kashyapa. He was also a disciple of Indra and has written a book known as Kashyapa Samhita. The other disciples of Punarvasu Atreya, Dhanvantari and Kashyapa, also wrote many treatises which are known after their names. Nimi and Videha founded the school of Ophthalmology and Otorhinolaryngology. In this manner Ayurveda was divided into 8 prominent branches and there were arrangements for regular teaching in the different disciplines of Ayurveda in Takhashila, Nalanda, Kashi, Ujjaini and other universities of that time. Even during the life time of Lord Buddha, a famous and very efficient physician and surgeon—Jivaka—was greatly honoured three times. He was a disciple of Atreya of Takhashila University. He also performed many abdominal and other operations which have been described in the Jataka Granthas. The Charaka Samhita and Sushruta were later on revived and re-edited in the first and second century A.D. During the 8th century A.D., the Khalifa of Bagdad invited many learned scholars of Ayurveda and got Ayurvedic books translated into Persian and Arabic. Thus,
Ayurveda, one might say, has contributed indirectly to the development of Unani medicine also. During the 9th & the 12th centuries A.D., Nagarjuna and his disciples made researches in minerals and metals and developed the science of Rasashastra (Pharmacology of minerals and metallic preparations).

About the 12th century A.D., certain invasions took place and gradually Ayurveda lost its state patronage, but still remained popular; and original additions were made to the literature of Ayurveda even up to the 16th century A.D. In the 16th century A.D., with the arrival of the Portuguese in this country, Syphillis found its way into this country. It was unknown to this country till then. But Bhava Mishra, a famous Ayurvedist of that time, gave the name of Phiranga Roga to this disease and described it as a contagious disease. He prescribed mercury for its treatment. Bhava Mishra’s book—Bhavaprakasha—is considered to be a very good book of Ayurvedic medicine. At the same time, Shri Trimalla Bhatta was also the first to prescribe arsenicals for the treatment of such ailments. The Europeans also adopted mercurials and arsenical preparations for the treatment of Syphilis afterwards and for a considerable period (up to the discovery of penicillin and other antibiotics). Mercury, Arsenic, Bismuth and Iodide remained as the main drugs for controlling Syphilis and its complications as was originally started by the Ayurvedic physicians.

The advent of the British was a big landmark in the decline of Ayurveda. Ayurveda was not only denied state patronage by Britishers, but they also took a negative attitude towards the system. The East India Company closed down existing schools of Ayurveda and started a Medical School at Calcutta in 1833. In spite of the lack of state patronage and suppression, Ayurveda remained quite popular with the masses and is still serving about 80% of the population of this country.

The tremendous national awakening around 1920 with the establishment of national schools and universities gave a boost to the revival efforts of Ayurveda and different State Governments were compelled to start regular teaching of Ayurveda and thus established State Boards, Faculties and Councils of Indian Medicine. To cite an example, Madras
started these in 1921-22, Bengal and U.P. in 1925-26, Central Provinces (now Madhya Pradesh) in 1937-39, Punjab in 1938, Mysore in 1942, Bombay, Orissa and Assam in 1946-47. The Banaras Hindu University was the first to establish a faculty for Ayurveda in 1927.

The Government of India also appointed a Committee under the Chairmanship of Sir R.N. Chopra in 1946 which also made several recommendations for Teaching and Research in Ayurveda.

In Jamnagar also, on the initiative of Dr. P.M. Mehta, the then Jamsaheb Shri Digvijaisinghji and Maharani Shri Gulabkunverba took great interest in the revival of Ayurveda and founded a Society which is known as Shri Gulabkunverba Ayurvedic Society which later on founded the Shri Gulabkunverba Ayurvedic College in 1946.

After independence, the Government of India and the State Governments took more interest in Ayurveda and on the recommendations of the committee appointed by the Government of India under the Chairmanship of Dr. C.G. Pandit, the first Central Institute of Research in Indigenous Systems of Medicine was established at Jamnagar in 1953, and a Post-graduate Teaching Centre was also started in the year 1956. The Gujarat State passed the Gujarat Ayurveda University Act in 1965 and on 5th January, 1967, this University was inaugurated by Shri Morarji Desai, the former Prime Minister of India. This is the only residential-cum-affiliating University exclusively for Ayurveda in this country. At present, in addition to the Institute of Post-graduate Teaching and Research, Shri Gulabkunverba Ayurvedic College, Ayurvedic Pharmacy & Hospitals at Jamnagar, 9 other Ayurvedic Colleges of Gujarat State are also affiliated to this University. The Institute of Postgraduate Teaching and Research is a University department and has six full-fledged departments. The University runs an Under-graduate Course of 5½ years’ duration, a Post-graduate Degree Course of 3 years’ duration and also provides facilities for research and the awarding of a Ph. D. Degree.

Besides this, 30 Universities in India have now faculties of Ayurveda and above 100 Ayurvedic Colleges are affiliated to these Universities. The Government of India have also estab-
lished a Central Council of Indian Medicine under the Central Council of Indian Medicine Act, 1970, which controls and regulates Ayurvedic education and practice. The Central Council for Research in Indian Medicine has also been established which runs various Regional Research Institutes, Centres and Units.

What is Ayurveda?

Ayurveda is composed of two words—'Ayur' and 'Veda' which put together literally mean 'Science of Life'. As regards the definite meaning, it would be interesting to note that the 'Life' which is the purview of Ayurveda connotes a combination of Sharira (Body), Indriya (Perceptory organs), Satwa (Mind) and Atma (Soul). Herein lies the originality of Ayurveda. Ayurveda takes into consideration even the 'Soul' which is still unknown to the other systems of medicine and which emphasises its spiritual, psychosomatic and total (wholistic) approach to achieve its declared goal which is not only the prevention and cure of diseases but also the promotion, prolongation and maintenance of a normal healthy and happy life. For the promotion, prolongation and maintenance of health, Ayurveda prescribes the observation of certain principles of Dinacharya (Daily routine), Ratricharya (Night routine), Ritucharya (Seasonal routine) and Sadvrata (Ethical routine) and also stresses that one must follow a regulated diet (Ahara), Sleep (Nidra) and Brahmacharya (Avoidance of mental or sexual intercourse without purpose.) Thus, Ayurveda is not only a medical science, but also a way of life.

Ayurveda takes into account fundamental principles like the creation theory of Panchmahabhuta, the Physiopathological theory of Tridosha (Vata, Pitta and Kapha), even the evaluation process of the universe and creation, since it believes that there is no essential difference between the outside world and the human body. Both are composed of Panchmahabhutas and thus influence each other. It has described separately and scientifically, the structure and functions of the different organs of the body and has given a basis of the drug actions also, which depend upon Rasa (6 different
tastes), Guna, Virya (Pharmacological actions), Vipaka and Prabhava (Empirical actions).

The Eight Branches of Ayurveda

As stated earlier Ayurveda has the following eight major specialities or disciplines:

(1) Kayachikitsa : (Internal Medicine)

According to Ayurveda, man as a whole lies within the purview of the science. (Aturastu Khalu Karya Desah). Mind and body can both affect each other and they comprise the seat of diseases. Thus the approach of Ayurveda from the very beginning is psychosomatic. Ayurveda has grouped all human beings into seven different types of Prakriti (Constitution) according to the predominance of one or more Doshas and has similarly also grouped into seven psychic Prakritis (Temperaments) according to the predominance of psychic Doshas. This factor is always taken into account in diagnosis, prognosis and treatment of diseases. Diseases are caused by the vitiation of Doshas affecting Dushyas and pathologically they have six different stages of Kriyakalas (Stages of treatment).

The Prakriti or Physical constitution of an individual depends upon the following factors :

(a) Condition of sperm and ovum at the time of conception.
(b) Nature of the season and condition inside the uterus.
(c) Food and other regimen adopted by mother during pregnancy.
(d) Nature of Mahabhuta (elements)—comprising foetus.

Prakriti is also influenced by the caste, family traits, locality, time, age and individuality.

Several infectious diseases have also been described in Ayurveda. But much importance has not been given to infections as causes as Ayurveda gives more importance to the
host factors. It is well-known that if the soil remains sterile, the seed will not grow.

In the course of treatment, the Ayurvedic physician has also to take note of vitiation of Dosha, affected Dushya, space, time, vitality of patients, digestive power, constitution, age, psychic factors, and likings and dietetics while treating the case. Ayurvedic medicines are derived from the compounded mineral, vegetable and animal kingdoms. More than 20,000 species of medicinal plants and herbs are found in India, out of which 2,000 are in use but 600 to 700 are commonly used in different preparations by the physicians. Several minerals and metals are also used, but they have to undergo various elaborate processes of purification and oxidisation before being put to use. The special therapy of Panchkarma is also used in the treatment. These are Vamana (Emetics), Virechana (Purgatives), Sirovirechana (Purification Processes of Sinuses) Niruha Basti and Anuvasanabasti (Specialised enmata with or without oil), but before doing Panchkarma, Snehana (Oleation internal and external) and Swedana, (different kinds of fomentation or Sweating) are necessary. Panchkarma therapy is also used as a pre-requisite therapy before Rasayana is undertaken.

(2) Shalyatantra

Sushruta has described it as the first and foremost speciality. Sushruta can be well-defined as the father of not only Indian surgery but of world surgery. He has described various stages (types) of inflammation, accidental wounds, burns, fractures and many major abdominal operations like intestinal—obstruction, stone in the bladder etc., and also specialised surgery like Plastic surgery (Rhinoplasty). Sushruta was the first man who advocated a good knowledge of anatomy and dissection of a dead body as essential for being a good surgeon, but later on Buddhism and certain traditions came in the way of development of this branch. Even today, Sushruta contains very useful material for further research work. However, now efforts are being made to revive certain techniques advocated by Sushruta in the Jamnagar Institution as well as in Banaras Hindu University and other places.
For example, Ksharsutra Chikitsa in anorectal diseases has been revived and in the cases of Fistula in Ano, it has been proved more advantageous and efficacious in comparison to modern surgical operations and sophisticated techniques.

(3) *Shalakya Tantra*

The field of this branch is Ophthalmology and Autorhinolaryngeology and the diseases for the head.

Nimi, Sushruta and Videh are the Authorities in this branch. About 72 eye diseases have been described by Sushruta and surgical operations for Cataract, Pterigium etc. have been described. Some special techniques have also been described for the treatment of diseases of Ear, Nose and Throat.

(4) *Kaumarbhritya* (Paediatrics)

This branch deals with the anti-natal and post-natal baby care and the care of the mother before conception and during pregnancy. Ayurveda has originally described methods for getting a child of the desired sex, intellect and prakriti. Various diseases of the children and their treatment have also been described in this branch by Kashyap, Sushrut, Vagbhhatt and others.

(5) *Agadtantra* (Toxicology)

This branch deals with toxics of the vegetable and mineral and animal kingdoms. The most interesting is that the concept of pollution of air and water, Desh and Kal (Time & Space) has also been given due consideration. If explored properly it may also provide material for research work to solve the problem of atomospheric pollution today.

(6) *Bhutvidya* (Psychiatry)

This contains the psychiatric diseases and their treatment. There is ample material for research in Atharvaveda and other Ayurveda Samhitas in this branch.
(7) *Rasayana* (Science of Rejuvenation and Prolongation of life)

This therapy is used to prevent diseases and for promotion and prolongation of a healthy life. As mentioned earlier, Panchkarma therapy is an essential pre-requisite for this therapy. The Sadvruta (Code of conduct in life) has also to be observed as Rasayana. The details of regimen about dietetics has been described which also help man to prevent aging and to enjoy a happy and useful long life.

(8) *Vajikarana* (The science of Aphrodisiacs):

This deals with the increasing sexual vitality and efficiency. The therapy of Rasayana and Vajikarana are closely inter-related. Vajikarana drugs also act as Rasayana.

Thus, Ayurveda is a very distinct medical science and has some unique features

(a) Ayurveda gives ample emphasis on the preventive aspects and helps in promotion and prolongation of a healthy and happy life.
(b) Its approach is Psychosomatic in dealing with healthy and diseased persons. It endeavours to treat man as a whole which is a combination of body, mind and soul.
(c) It gives due consideration to the basic constitution of an individual while diagnosing and treating him.
(d) Ayurvedic drugs have no side effects and may be taken by healthy individuals for maintenance of life as tonics.
(e) Ayurvedic medicines are not very expensive and a physician can treat a patient by the plants and herbs available around him.
(f) The diet and other regimen prescribed by Ayurveda are in accordance with the customs and traditions of the people.
AYURVEDIC CONCEPT OF HEALTH AND DISEASE

L.S. BHATNAGAR

The words *Sukha* and *Arogya* are synonyms which respectively mean *Happiness and Health*. Similarly the words *Dukkha* (misery or unhappiness) and *Vyadhi* (disease) are synonyms. According to the Ayurvedic concept, any state of discomfort or pain is included under the term *Vyadhi*. Even the sensations of *Trit* and *Kshut* (Thirst and Hunger) and emotions of *Raga* and *Dwevha* (attraction and repulsion) have been included under natural *Vyadhis* which require immediate attention to lead a healthy and useful life.

While defining Health and Disease, Vagbhatta states that normalcy or state of equilibrium of the *Tridoshas* denotes the state of health and any deviation there of signifies disease.

The human being i.e. the *Chikitsya-Purusha* with whose health we are concerned here is a composite whole of *Satva* (the mental and psychological element), *Atma* (the spirit or soul) and *Sharira* (the physicochemical component comprising *Dosha, Dhatu and Mala*). Therefore, the concept of health according to Ayurveda in its undivided and integrated form signifies physical, mental and spiritual health. The *Swastha-vritta* (Personal Hygiene) stands supplemented by *Sad-vritta* (code of conduct) which inculcates discipline of the senses and mind and the regulation of moral and social life so as to accord happiness and good not merely of the individual but also of humanity as a whole.

Again, the concept of health is individualised, as no two persons are found alike in appearance or behaviour. The very word *Swastha* meaning healthy, signifies it by the term *Swa* i.e. one's own individual constitution.

The *Tridoshas*—*Vata, Pitta* and *Kapha*, are always in a state of unstable equilibrium and have to adapt themselves to the
everchanging environmental factors; these environmental factors appearing in a little more, less or altered form are likely to cause a disturbance in the state of equilibrium of these factors which in turn may initiate a disease process. Therefore, for the maintenance of ideal health, even transient disturbances are not allowed to go unnoticed and uncared for. The maintenance of the norm and the prevention of deviation therefrom, thus become the main points to be looked for, in the maintenance of health and prevention of disease. While defining a person in normal health, Sushruta says that the person should have normalcy of structure and function of the Doshas, Agnis, Dhatus and Malas and he must have purity and clarity of his Indriyas, Manas and Atma. The important point worth noting is that the definition is not limited to the body only but also includes well being of the mental and spiritual faculties as well. He further states that it is not possible to lay down or standardise the exact measure of the Doshas, Dhatus and Malas owing to their varying nature in the process of adaptation to the continually changing environmental factors as well as individual variations of the body constitutions. If a physician wants to know the state of equilibrium or imbalance of all of these or any one of these, he can do so by inference only by finding the signs and symptoms of perfect health or disease as the case may be in the individual.

One can remain free from diseases and can maintain his health if one adheres to certain rules.

A person lives his full span of one hundred years (36,000 nights) respected by all, if he satisfies the following two conditions:

1. He should take suitable food (Hitabhojanah).
2. He should practice self-control (Jitatma).

Condition number one is physical, and condition number two is mental and spiritual. According to Ayurveda, both are equally important.

A person can maintain his health only if he strictly observes the prescribed daily and seasonal routine.

Ayurveda considers that the three pillars supporting life-
are food, sleep and self-control. Let us first deal with *Ahara* (food).

The *Sharira* including *Indriyas* and *Manas* is *Panchabhautik* in composition (made up of five *Bhutas*) and requires proper nutrient materials for the maintenance of its structural and functional entity. The *Ahara* (food) which one ingests is the source of these materials. It is to be noted here that the nature of the food we eat affects us not merely physically but also morally and mentally as well. The classification of the articles of food, therefore, apart from their *Panchabhautika-Shad-Rasatmaka* composition and influence on physical factors, has also been made as *Sattwika, Rajasa and Tamasa* according to its effect on the mental and psychological faculties of the man.

*Ahara* :

Charaka says that *Hitahara* (Wholesome food) is responsible for *Sukha* (Healthy life) and *Ahita-Ahara* (Un-wholesome food) is the cause of *Dukkha* (disease). The various kinds of wholesome nutritional substances consumed in various forms, after being properly digested and metabolised by the action of various *Agnis* (factors responsible for converting ingested materials into acceptable homologous materials) imbue the entire body with growth, strength, complexion, happiness and life by replenishing the body elements, so long as the circulation of various substances through the *Srotamsi* (the gross and minute pathways) remains unhampered.

The pharmacological concept of *Rasagunavirya-Vipakaprabhava* as explained in connection with drug action by my colleague Prof. Dhyani also holds good for *Ahara Dravyas*. All substances are endowed by nature with certain definite properties according to these five categories. The properties of these articles of diet may be altered, to some extent, by the-time factor or *Samskara* (various methods of processing, cooking etc.). It is the proper quality and quantity of food and the observance of rules of eating that are mainly responsible for the proper digestion and assimilation of food into its ultimate form. Ayurveda lays much stress on the obser-
vance of the rules regarding diet some of which are placed before you.

Food taken only twice daily is the ideal for an average adult, but hard working persons and children and young persons (in the growing age) may take food more than twice provided they feel hungry. The general rule is never take food within three hours after the last meal, nor starve for more than six hours. The important point which should be taken note of in this regard is that one should take food only after the earlier meal has been properly digested.

Only those articles of diet which keep up the health of the body and which do not cause any disease should be used. These may be different for each individual according to his Prakriti (Physical and mental constitution) and Satmya (suitability for self). Therefore, one should eat after an adequate survey of one's own self, nothing carefully what is suitable to the self and what is not so suitable. The Ushna, Shita, Guru and Laghu properties of food articles are well understood by even the uneducated common man in India and accordingly he tries to consume suitable articles. A person of Pittaparakriti or suffering from Paittik diseases will try to avoid the use of Katu and Ushna substances which are unsuitable for him and will take Madhura and Shita Dravyas suitable to him, so on and so forth.

Generally speaking, on the whole, food having all the six Rasas is the best. Excessive use of one or the other Rasa disturbs the equilibrium and normalcy of the body constituents. Charaka says that a well-balanced general diet should consist of Shali (Rice), Mudg (green gram), Saindhava (rock salt), Amalaka (gooseberry), Yava (Barley), Autariksha-Jala (rain water) Paya (cow's milk), ghee (cow's milk butter-clarified), Jangal Mamsa (flesh of animals living in forests) and honey.

One should include or exclude the articles of diet according to their suitability or unsuitability during different seasons (Ritus) eg. : in winter one should take articles which are sweet, sour and salty consisting of wheat, black gram, milk, meat, oil and animal fat, while the articles which are Laghu Vatal (increasing Vata) should be avoided. Just an opposite
dietary regimen has been prescribed for *Vasant Ritu* (Spring season).

One should take food in a measured quantity each according to his *Agnibala* i.e. digestive power. This will also depend on the nature of the food articles, whether *Guru* or *Laghu* and on the season, place and time.

One should not eat too quickly or too slowly. Similarly one should not indulge in talking and laughing while eating but should concentrate one's attention on the food being eaten.

One should take food in an agreeable place and in the agreeable company of friends and family members. All this has been summed up by Charaka:—

Remembering that many painful diseases arise from irregular food habits, a wise man, should take food that is beneficial to him and according to proper measure. Further he should eat at proper times and should keep his senses under his control.

*Nidra*:

The second pillar of a healthy life is sleep Happiness or misery, plumpness or leanness, strength or weakness, knowledge or ignorance, in short, the very life or death depends upon sleep.

Sleep is the most absolute form of rest for the body and the mind and it is essential alike in health and disease. Ayurveda differentiates sleep and gives the following varieties according to the causes which produce sleep:

(i) *Tamasi Nidra*—caused by *Tamoguna*. Death is considered as *Nidra* occasioned by *Tamoguna*.

(ii) *Kaphodbhava*—caused by excess of *Kapha*.

(iii) *Skramodbhava*—caused by tiresomeness of the body and mind. When the mind is tired, the senses are withdrawn from the objects and then one gets sleep.

(iv) *Agantuki*—caused by external causes such as injuries to head.

(v) *Vyadhyanuvartini*—appears as complication in a disease.

(vi) *Ratriswabhavaprabhava*—caused by very reason of nightfall.
Of all the above varieties, the last one is natural sleep which improves nutrition and strength of the body, causes enthusiasm and alertness, promotes digestion and maintains the equilibrium of the Dhatus.

A person who wants to lead a healthy life is required to observe the rules about sleep eg :—one should go to bed at the end of first Yama after nightfall i.e. at about 9 P.M. and should get up from bed in Brahmanuhurta i.e. 48 minutes before sunrise. Thus a sleep of about 6 to 8 hours in the night is essential. In the summer season one should sleep for a while in the day-time too. Persons who are lean and thin have also been advised to sleep after meals in the daytime. While others who are fat and accustomed to fatty foods or having Kapha constitution or suffering from Kaphaja diseases, should not sleep in the daytime.

Brahmacharya:

The third Upastambha (Pillar) is Brahmacharya. It generally means bachelorhood and more particularly the living of a life of self-control and study leading to the knowledge of Brahma (God). According to Indian philosophy all work should be done in a spirit of dedication to God, then you are not attached to your actions and this will free you from all sorts of worries and lead the way to peace and liberation which is the ultimate aim of life.

Brahmacharya can be divided into three kinds—physical, mental and spiritual. Physical Brahmacharya is celibacy which includes a regulated family life. Mental Brahmacharya is to keep up the balance of the mind against sex excitement. Spiritual Brahmacharya is to acquire true knowledge of Brahma and be in continued contact with Brahma.

Ayurveda divides the duration of life of one hundred years into three periods; Balya, Yuvana and Sthavira. Balyavastha is the age of growth of the body and is meant for acquiring education. Vatsyayan has specifically stated that till one completes his education, he should remain a complete Brahmachari. The marriageable age has been fixed at 25 years for males and 16 years for girls. After marriage too sexual intercourse stands regulated. It is not permitted on festival
days and days of menstrual periods and with a lady other than one’s own wife. *Shukra* is the seventh or final *Dhatu* on which depends the strength of body and mind and is the source of *Bija*—the element essential for reproduction. Therefore, it must be preserved carefully.

In Ayurveda, good conduct is called *Sadvritta* which means living a good life. In India, civilization is not measured by material standards, but by moral, intellectual and spiritual standards. Performance of one’s duty to oneself and to society are essential parts of these standards. Ayurveda pleads not only that one should lead *Sukhayu*—a healthy life but also a *Hitayu*—a life useful to other animals and to human society at large. It lays down a strict daily routine and regimen it minute detail to be followed by all. Some of the salient features are given below:

*Dinacharya and Ratricharya:*

One’s daily routine generally should comprise of the following acts and every act should be performed in accordance with the instructions in that regard, using proper discretion at all levels:

- Leaving the bed before sunrise.
- Evacuation of bowels.
- Cleaning of teeth by medicated powders mixed with oil and salt or by fine brushes made of green twigs of trees having suitable *Rasa* according to the season and one’s constitution.
- Oil gargles and washing of mouth, eyes and face with water or decoctions of suitable herbs.
- Dropping of oil into the nostrils and ears and massage of oil on the head and over the whole body.
- *Vyayam* (physical exercise) till one gets sweating of forehead and armpits and respiration through mouth.
- *Snana* (bath) with cold or warm water according to the season and one’s constitution.
- Wearing of clean and comfortable dress according to the season. There should be different dresses for sleeping, working and worshipping.
Devatarchan i.e., worship of God according to one’s faith.
Bhojan (Lunch) already dealt with under Ahara.
Work or study or earning a livelihood or social service.
Ratri-Bhojan (Dinner) followed by a little walk.
Vyavaya (Sexual intercourse) only for married couples at night before sleep.
Sleep—already dealt with.

Ritucharya:

The seasonal variations have much effect on the human body and mind. Ayurveda recounts these effects in detail and also gives a detailed account of the food, behaviour and routines which one should follow to maintain the equilibrium of the Doshadhatumalas.

In India, we have six Ritus (Seasons) each of two months duration; namely Vasanta, Grishma, Varsha, Sharad, Shishira and Hemanta. Vata, Pitta and Kapha are in natural course provoked by seasonal effects during Varsha (rains), Sharad (Autumn) and Vasant (Spring) respectively, preceded by their accumulation in the preceding Ritus (seasons). Therefore, one should not indulge in such foods and acts which are likely to increase or provoke the respective Doshas. Again, one should resort to Vamana (Emesis), Virechana (Purgation) and Basti (Enemata) respectively to eliminate the accumulated Dosha. Thus, one can preserve one’s health by preventing the diseases caused by seasonal effects.

Dharaniya and Adharaniya Vegas:

This is an important aspect for the maintenance of health as dealt with in Ayurveda. The urges of passing out wind, stool, urine or those of thirst, hunger, sneezing, coughing, yawning, weeping, vomiting and of passing semen should not be checked. A person who does not attend to these calls of nature as and when they are felt and tries to neglect or check them, is subjected to a number of diseases.

There are other urges, however, which must be checked and controlled. These are of greed, grief, anger, jealousy, violence, cruelty, stealing, raping, boasting, speaking lies
and harsh words and the urges of hazardous physical and mental acts beyond one’s capacity. Whoever does not try to control them also becomes a victim to diseases.

One verse of Charaka sums up everything one needs to know about the maintenance of one’s health:

“A person who is accustomed to suitable diet and habit, who acts with proper understanding, who does not entangle himself in the objects of his senses, who is charitable, who behaves equally towards all living creatures, who is devoted to truth, who forgives and who is humble and respectful to the learned and wise, is never attacked by disease.”

Till now we have tried to understand the concept of health. Let us now consider the causation and prevention of disease.

All diseases, according to Ayurveda, are caused by vitiated Dosha and this vitiation is caused by indulgence in various improper acts and habits.

The causation of disease in Ayurveda is two fold—Intrinsic and Extrinsic.

The Intrinsic cause is chiefly concerned with the abnormal condition of the Doshas. Whatever may be the nature of the external exciting factors of the disease, which are innumerable and varied, the actual intrinsic factors which become excited and imbalanced, either conferring a predisposition to or actually causing morbidities are, according to Ayurveda, the Tridoshas—namely the Vata, Pitta and Kapha. There can be no disease unaccompanied by the abnormality of these Doshas. Even the traumatic diseases which are not caused by imbalance of these Doshas, become soon accompanied by Doshic imbalance.

The extrinsic cause is concerned with external causes which bring about the abnormality of the Doshas and Dhatu. It is described under three heads:

(1) Asatmyendriyartha Samyoga—incompatible correlation of senses with their objects. This correlation can either be defective or excessive or perverted.

(2) Prajnaparadha—faulty understanding. This has reference to causes from within which result in the defective, excessive or perverted actions of the body, mind or speech.
(3) Parinama—Effect of seasonal changes and variations governed by the time factor.

Ayurveda classifies the diseases into three categories (1) Nija—where imbalance of the Tridosha is the first and foremost feature, (2) Agantuka—which are caused by external mechanical injuries or poisons and (3) Manasa—where imbalance of Raja and Tama Doshas and abnormality of the mind are the main features. The diseases have also been classified into seven types according to their causation: (i) Adibalaprapvritta—the hereditary diseases derived directly from the defects in the Bija i.e. reproductive cells of parents. The defects may be apparent at the time of birth or may remain dormant to appear at a later date. Ayurveda believes that it is the tendency or susceptibility to certain diseases, which is inherited. (ii) Janmabalaprapvritta—the diseases arising during intra-uterine development due to defective antenatal care or non-observance of a regulated life by the mother. These are of two types one Rasakrit (nutritional) and the other Dauhrida/ja i.e. due to ungratified cravings of the mother during the period of her pregnancy. (iii) Doshabalaprapvritta—the diseases caused by the deranged Doshas. These also stand subdivided into Sharirika (physical) and Manasika (mental). (iv) Sanghatalaprapvritta—the diseases produced by trauma and attacks of wild animals. (v) Kalabalaprapvritta—the diseases caused by climatic, seasonal and atmospheric changes. (vi) Daivabalaprapvritta—This category includes the diseases which are engendered by forces beyond human control, considered to be caused due to providential dispensation or acts of God. Some of the diseases included under this category, are considered to be embodiments of curses, divine wrath or displeasure, or are caused through mystic powers of charms and spells. The diseases as lightning effect and the infectious diseases which may assume the form of epidemics are also included in this category. (vii) Swabhavabalaprapvritta—This type includes diseases which arise due to natural organic and functional changes in the body and mind such as senility, hunger, thirst, sleep etc. These are described as Kalakrit. But when these appear prematurely at an improper time, they are called Akalakrit.
From the etiology of the diseases which are given, it would appear that the bacterial infection as a specific cause of disease has not been included. This is because, according to Ayurveda, the role of germs in production of disease is very insignificant. Even though, there exists ample textual evidence of the knowledge of germs being causative factors of several diseases and the spread of such diseases through air, water, food and personal contact, still germs hold a very insignificant position in the Ayurvedic concept of etiology. The reason is that from the Ayurvedic point of view, production of disease in the body depends more upon the internal derangement rather than on external agency. In other words the soil on which the germs are bred is held more responsible for the disease than the germs themselves. Ayurveda believes that the germs are ubiquitous and are to be found in the air we breath, in the water we drink, in the food we eat and on the soil where we live and, therefore, it is practically impossible to keep out their contact with the body. It is only when the health is undermined by non-observance of Swasthavritta and Sadvritta that infection develops. If germs alone were to determine the attack of a disease, it would be virtually impossible for any one to escape from their clutches and the human race would have been extinct long ago. But it is here that the factor of the body the soil comes in to save the race. If one looks into the insanitary and unhygienic conditions in which the vast majority of people in India live, one will be convinced of the Ayurvedic point of view. The wide prevalence of healthy carriers of a number of disease germs also goes in favour of Ayurvedic view.

At this point, it may be relevant to know what Ayurveda says about Immunity. Chakrapani defines the Vyadhiksha-matwa (Immunity) as the power on the part of the body to prevent the development of the disease or the power to successfully resist a developed disease.

His definition is generally applicable to infectious as well as non-infectious diseases. It is definitely stated that all bodies do not have the same power of resistance against all diseases. Persons who are too plump, plethoric, fat, lean, whose blood, bones and muscles are not well developed, who take an unbalanced or deficient diet, who are weak or
nervous, have very little power to resist disease; while persons of opposite character are in a better position to resist a disease. Ayurveda believes that if the body is kept perfectly healthy and its Bala is maintained at its best, there can be no chances of its falling a prey to any disease.

In Ayurveda, the Bala (Strength of the body) has two main aspects, (1) Vyayamashakti (Physical strength) and (2) Vyadhikshamatwa (Power of resistance to disease). This has been classified under three main types: (1) Sahaja— which is natural, inborn or genetic and exists from birth; (2) Kalaja—this type of resistance is stated to be influenced by seasonal traits and the age of the person; (3) Yuktikrit—this type of resistance is acquired by resorting to appropriate Ahara, Nidra and Brahmacharya and use of restorative and Rasayana therapy. The factors which maintain and promote the Bala or the natural resistance of the body are contributed by Rasa, Rakta, Kapha, Shukra and Oja. Again it has also been stated that the training of the body by the same material which produces the disease, can cause resistance to the disease.

Thus, for the prevention of disease Ayurveda lays stress on the maintenance and promotion of natural defence mechanism of the body by the observance of Swasthvritta and Rasayana therapy in the first place, though the principle of active immunisation has not been lost sight of.

Lastly, a word about the concept of pathogenesis and the manifestation of disease. Our bodies are conditioned for adaptability to variations in the environment and to the stresses to which they are subjected to within certain limits. It is only when the stress exceeds these limits that a disease-process begins. Ayurveda divides the disease-process into six stages known as Shat-Kriyakalas meaning the times of action to check the process further.

These are (a) Sanchaya—the stage of accumulation of Doshas at their own seats in the body, (b) Prakopa—the stage of provocation of Doshas when they develop proneness to spread (c) Prasara—the stage of actual spread of the Doshas throughout the body, (d) Sthanasansraya—the stage of interaction of Doshas with Dhatus and taking seat in various organs of the body. In this stage the prodromal symptoms
of a disease appear. (e) *Vyakti*—the stage of appearance of signs and symptoms of the disease, and (f) *Bhedā*—the stage of complications or convulsence terminating in death, cure or disability.

The first three stages of *Sanchaya, Prakopa* and *Prasara* constitute the abnormalities limited to *Doshas* only which obviously relate to functional derangements. The next three stages of *Sthanasansraya, Vyakti* and *Bhedā* relate to the actual manifestation of the disease and the organic changes occurring in the *Dhatu* and various organs of the body. The earlier the physician checks the process of the development of the disease the better. Definite signs and symptoms of the vitiated *Doshas* in various stages of *Sanchaya, Prakopa* and *Prasara* stand clearly described in the texts and the physician is expected to identify the stage in which a particular *Dosha* is passing through so that he may be able to prevent further progress of the disease-process.
The fundamentals of Ayurveda, as described by Susruta briefly, are: Person-Purusha, Disease-Vyadhi, Drugs-Aushadha and time factor-kala. Charaka has expressed the same even more briefly as Purusha and Loka. Purusha is individual organism i.e. Man and Loka is Universe or Environment. Disease is a disturbed condition of Purusha, so it is included in Purusha and Aushadha and Kala are parts of the Environment. Ayurveda mainly deals with disease and medicines but a discussion of Purusha as the basis of diseases and their treatment and likewise, a discussion of Loka as the basis or source of the medicine is also absolutely necessary. We shall see later that these have been elaborated in different classifications for explaining the vast sphere of Ayurveda.

Broadly speaking objects that are to be studied are Premeyas; the means of knowledge are Pramanas.

Objective of Ayurveda

Can we escape from the clutches of death or at least postpone its onrush? Can we remain free from disease and be healthy, youthful, energetic and full of vigour and initiative for the achievement of the higher ideals of Dharma and Moksha?

These were the problems to which the ancients addressed themselves and Ayurveda was developed as a science which engaged itself in solving these riddles.
What is Ayurveda? History of its development

Before we proceed in the discussion of the fundamentals of Ayurveda, we may first clarify why it is called Ayurveda. The word Veda in the compound word Ayurveda, is to denote knowledge or Science. It is qualified by the word Ayu. That means a science dealing with Ayu or Life in its all aspects. Ayurveda is part of the four Vedas and that in antiquity and sanctity it equals them. The word Veda can only be applied if the subject matter can be traced to any one of the four Vedas. Thus the Atharvaveda and Rigveda are referred to as the sources of the origin of Ayurveda. We have references to diseases, medicines, operations and physicians and other allied matters in the Vedas. This knowledge was later developed as a separate branch with the name of Ayurveda. Development further progressed incessantly and in due course of time it branched in eight specialities of treatment and ten branches of fundamentals viz., (1) Kayachikitsa—Internal Medicine (2) Shalya Tantra, surgery. (3) Shalakya Tantra—Ophthalmology and Oto Rhino laryngology etc.; (4) Kaumarbhritya—Diseases of women and children, (5) Bhuta Vidya—Mental Disorders, (6) Agada Tantra—Toxicology, (7) Rasayana—Rejuvenation, (8) Vajikaran—Virilific Medicine, Aphrodisiacs.


Furthermore, with the development of knowledge chemotherapeutic, drugs of mercury, metals, poisons and gems were incorporated as Rasa Chikitsa. People of different countries were in touch with each other and the flow of ideas or drugs were the natural result. They were never prevented but were critically examined, tested and then assimilated in Ayurveda. This is evident from the account given in Charaka Samhita
of how Ayurveda was brought from the land of the immortals—Swarga—to this land of the mortals—the world. And the latest evidence is of Bhav Prakash who incorporated and described diseases and drugs which were prevalent in foreign countries, new to this land which appeared after contact with Westerners. The bold statement of Charaka that there is nothing in the world which is unfit to be used as a medicine, if it is used rationally and as a means to definite ends, is also a proof of this broad outlook. Transmission of this knowledge, after its validity being tested and established, was in the form of discourses and dialogues between pupils and preceptors. These discourses were later compiled in the form of treatises (Samhitas).

This narrative shows that diseases and varieties of wounds and injuries inflicted in fights and battles along with the means of their treatment were already known before the Mantras were revealed to the seers of the Vedas, who recorded them in different Suktas. Charaka Samhita mentions that diseases and knowledge of their treatment are as old as life itself. The living organism experiences painful sensations and by instinct recognises their causes and knows how to get rid of them. This is why Ayurveda is called eternal and beneficial to all creatures (Sanatana-Sarva Bhuta Hita). This knowledge has developed from instinctive activity of self preservation to the status of a Science of Therapeutics and positive health, in the course of human evolution, which contains the rational application of drugs, foods, surgical and physical means and rules of conduct.

**Man—an integrated view**

What is meant by Ayu? Ayu is defined as a composite material wherein five Bhutas which constitute body, senses, mind, and soul are all combined together and unified. It is also called Purusha, Puman, Chetana, Samyoga Purusha, Rashi Purusha, Karma Purusha, Chikitsodhikrit Purusha, Vyadhi adhishthana, Suka-Dukkha ashraya, Bhogayatana, Rogayatan etc.

Life in any form embodies all these constituents and thus deserves the word Purusha. Here parts have no independent
meaning but the integrated whole is considered as a functioning and conscious unit individual being.

Nature of the living organism and effects of the Environment

A state of matter in which the stream of life continues for a certain period is called \textit{Ayu}, which has a consciousness of pain and pleasure; which is capable of thinking, recognizing and judgment, has automatic activities and reacts to stimuli from without; and is composed grossly of body, mind, senses and spirit. The body and mind are gross ingredients of life and are composed of Panch Bhutas or twentyfour Tatwas (Elements). Mind and spirit are incomprehensible by senses but their presence is essential for life. In their absence there is no life. Death ensues. The whole mass turns into a corpse. Because \textit{Ayu} is the product of integration of these several constituents, it perishes when these constituents disintegrate. All the constituents except the spirit are perishable. Spirit being indestructible has a continuous existence and has the capacity to hold together these various ingredients for a certain period. That is why one synonym of \textit{Ayu} or \textit{Chetana} is \textit{Dhari} meaning one which holds together. Thus stress is laid on the totality and integrated nature of an individual. The living organism because it is conscious, it communicates with outer world and reacts to it. \textit{Indriyas} are the means of communication and reaction to the outer world. The body and \textit{Indriyas} are the instruments of the spirit for enjoying the life or for attaining higher ideals. Mind is the driving force and a link between the spirit and the physical body. Thus, Man can only be viewed as a whole, not in the form of independent fractions. Mind affects body when agitated by influences of emotions—\textit{Kama}—lust, \textit{Krodha}—hate, \textit{Bhaya}—fear, \textit{Lobha}—avarice etc. and body also affects mind. Disturbance of body elements changes the moods of the mind. Both body and mind are influenced by the outer world—physical and social changes.

Bodies are innumerable and of various forms but are grouped in four main classes—(1) \textit{Jarayu}ja—those coming out of the foetal membranes which cover the foetus, (2) \textit{Andaja}—those having birth in the form of egg, (3) \textit{Swedaja}—those tiny
forms which are produced as a result of heat and humidity.
(4) Udbhidja—those sprouting after piercing the earth.

All animate beings right from human or divine existence to the tiny creatures, have bodies peculiar to their species. It is the nature of all bodies that they vanish in due course of time. But the spirit living within these bodies never vanishes, it always develops and matures in experience and finally works out a path of salvation. This is possible in the human incarnation only, because the human species is far advanced in intellect, thought, memory, judgment, skill and action. It can rise beyond instincts and lead a purposeful life and attain judiciously set.

Though Ayu is found in various forms, according to the distinctive bodies they possess, they all can be covered under the above mentioned four classes. Ayurveda is not exclusively for human welfare but is also meant to deal with the problems and troubles of all these classes. There is Vriksha Ayurveda for Udbhids—Go, Ashwa and Hasti Ayurveda for animals and Ayurveda proper for human beings.

Philosophies which are reflected in Ayurveda

In describing the creation or genesis of the world and enumerating the constituents of Purusa and Universe, Ayurveda has followed the philosophies of Nyayavaisheshik, Samkhya, Yoga, Mimansa, and Upanishad or Vedanta with slight modifications. Darshanas aim at imparting the knowledge of discrimination of Sat (Reality in the creation) from Asat (Unreal substances) and differentiation between Anitya (unstable-destructible) and Nitya (stable-undestructible) substances.

The emphasis is on how to realise the self which is Sat and Nitya, and to pursue and attain identity with the universal Chetana i.e., Brahma or Moksha, and to overlook and get detached from perishable worldly things.

Ayurveda on the other hand has departed a little from the line of Darshanas. It does not advocate a neglect of the body which is unstable but stresses the need to take care of it to prevent its destruction, to promote its stability, to infuse it with vitality and vigour, in order to prolong existence at the peak of health. At the same time it also enjoins one to
exercise self-restraint, to cultivate detachment and to make constant efforts for the realisation of self.

All Darshnas and Ayurveda too believe in the continuity of Atma in the cycles of birth and death and rebirth. The concepts of the creation of gross materials by the union of minute particles of various Bhutas and Atma and the concept of Dravya, Guna, Karma Samanya and Visesa are imbibed from Nyaya Vaiseshika. The concepts of Trigunas, contained in the ever changing Prakriti which evolves and involves, the Chetna Purusha which is Nirguna constant and unaffected, the Linga Sharira and Samskur and Vasana carried by it are taken from Samkhya, concepts of practice of Yoga, Satwavajaya Dhriti and Samadhi from Yoga. Concepts of Karma (good or bad deeds) and the doer never escaping from the Karma Phala,(the result of his deeds) are taken from Mimansa. And the concept of freedom of Atma from all bonds of pain and pleasure and the ultimate fusion of the individual Atma with universal consciousness is taken from Vedanta. Thus Ayurveda has much common with other Darshanas. Everyone is unanimous in their agreement on the following points : (1) Panch Bhutas (5) proto elements (2) Ten Indriyas (motor and sensory organs) (3) Manas (mind) (4) Atma—(spirit) (5) Karya Karma Sindhanta (Universal law of cause and effect). They differ only in details of the theory of evolution of the Universe and Man either from one element or two elements or many elements. They also differ on the number and reliability of various means of knowledge i.e., Pramanas. However, perception through five sense organs is agreed by all, as one of the potent means of knowledge and because a human being has only five sense organs, through which he can examine the outer world, he has classified the elements of the outer world in five categories only according to their specific attributes which can be identified by a particular sense organ. Thus classification of five Bhutas is based on the capacity of the five Indriyas which give different types of sensations of Shabda (sound) Sparsa—(motion, heat and cold touch) Roopa—(light and form and colour sensations) Rasa (taste) and Gandha—(smell). (Auditory, tactile, visual, gustatory and olfactory sensations).

Coming 15 Ayurveda proper, human organism or all organism for that matter are prone to pain and pleasure-
(Sukha-Dukkha) which are innate attributes of life (Atma gunas, Sahaja bhava, Swabhavika Raga) so also are the events of Janma and Mrityu (birth and death). They also are inevitable for living matter and are described as a form of pain or bonds to the spirit Atma. All movements and activities, not only of human beings but of all creatures have only two purpose at their root—to avoid or get rid of the pain and to attain ease, happiness, pleasure or bliss. "Sukharithah Sarvabhootanam Matah Sarvah Pravrittayah." (A.H.) By instinct he tries to know the sources of the pain, so as to avoid them or get rid of the pain at least and also tries to know the sources of pleasure and to acquire them and to enjoy them without interference as long as possible, ("Prana Estana"; "Dukkha dweshana Lolupah"; "Kah syat tesam samopayah"; "Deergham jeevitam anvichhan", "shreyaso jeevitasya cha").

Thus knowledge of Ayurveda embodies the knowledge of the happy or the troubled condition of an individual and also the knowledge of sources or causes of pain and pleasure (Hetu); the effects of these causes (Linga) and the effective means which relieve the pain and enhance the pleasure (Aushadha).

Philosophies in the past and sciences today have been developed to achieve the same objects—attainment of permanent ease and eschewing possibilities of pain. Ayurveda may be considered as both, philosophy and science because therein is discussed the origin of man, the origin of the Universe, the origin of pain and disease, and the possible ways and means of getting permanent pleasures, and of riddance from the ties of the world and thus the final attainment of liberation on one hand; and on the other hand the problems of the practical world facing our course of life and disturbing it, application of the general knowledge in identification of the diseases affecting body and mind, their causative factors and the drugs and practices which cure them.

When we talk of pain and pleasure, we take it for granted that the perceiver is a conscious living being (Chetna-purusha) who is subjected to either of the two conditions Health or Disease (Arogya-Roga; Vikarah Prakritischaiva Dvayam Sarvam Samasatah), and who can express his experience and strive for improvement. The opposite state in non-living, devoid of
-consciousness or an inert mass (*Jada-Achetana*). The objects which are perceived by the Purusha may be from without and may be of both types living or inert. The outside world which surrounds the individual is called *loka*—Universe or environment. This is also further classified as *Aadhidaivika* (supernatural or divine) and *Aadhibhautika* (material or physical world) the latter is also called as *Agantu* that which inflicts. The Purusha may also perceive objects from within i.e., in his physical self. This is termed as *Aadhyatmika Loka* internal environment of *Nija* belonging to one's own self.

**Common origin of Universe and Man**

Ayurveda has accepted the concept of the common origin for the Universe and man who is living in it but as a part of that environment.

Five basic constituents or *Panchbhutas* are common ingredients which exist both in Man and in all things which surround him. *Ahara* or food is the first necessity of life. If there were common factors between the outside world and the inside tissues then alone can he get food and nourishment constantly from without and survive. For existence and for growth food is to be ingested, digested and assimilated. By having common elements between the food and the body tissues, the assimilation and nutrition is made possible.

**Constituents of Creation—Anitya and Nitya—(Perishable and non-perishable)**

The creation is divided in two main classes—*Chetans* or living and *Achetana* or non-living. "*Sarvam Dravyam Panchabhautikam Asmin Arthe; Tad Dwividham—chetanam ca*" Whatever is (be it a Purusha (conscious) or Universe) created is bound to perish (*Anitya*). This is a general rule accepted by Ayurveda. However certain categories are accepted to be permanent, non-perishable or eternal (*Nitya*). *Atma*—in individual life and in all pervasive consciousness is non-destructible and eternal, having a continuous existence. *Prakriti* and *Purusha* both are considered eternal by Samkhya and Yoga; the rest which are evolutes are perishable. And substances having *Anu Pariman* and *Vibhu Pariman* (conditions of
substances of minutest and biggest measurements) which are only to be comprehended by imagination—are permanent, while substances of intermediary measurements are unstable and destructible according to Nyaya Vaisheshika. According to all Darshanas, atma is considered to be eternal while the rest of the body constituents are perishable. Five bhutas or twenty-four elements are taken as common ingredients both in the body (Seven Dhatus) and the environment. Body is composed of Tridosas which are dynamic forces and activators; Dhatus, different tissues and organs and Malas the refuse which are excreted; and all of which and the products of food, which comes from different sources—Jangam—animals, Audbhida—vegetables and Parthiva—minerals.

Common factors are further stressed by pointing out the oneness between environment and body elements in the form of Sun, Moon and Wind in the outer world and Vata, Pitta and Kapha in the body in their effects of heat, humidity and motion and velocity. That is why the effects of variations in the outer world are reflected in the bodies of living organisms of any type be it vegetable, animal or human. The Sun, due to its heat dries up the substances on the planet earth. The Moon on the other hand gives humidity due to moisture and Vayu fluctuates and disperses these two effects due to its unstable nature. The functions of Vata, Pitta and Kapha in the body are similar.

Trigunas and Tridoshas—Fundamentals of the Universe and Man.

Trigunas of Avyakta viz. Sattwa, Rajas and Tamas are invariably transmitted in all subsequent evolutes. So, they are present in the five Bhutas and Tridoshas too.

Out of the five Bhutas, Akasha (space) the first evolute, is considered all pervasive; and Prithvi, the mass or matter, the last evolute, is considered gross and inert. These have no capacity of movement of their own. The remaining three Bhutas are constantly on the move: Vaya having velocity and motion, Agni having heat and light and Ap having properties of cohesion. Out of the five philosophical elements—pancha Bhutas—Vayu, Agni and Ap are dynamic always in a condition of flux and were transformed into three Doshas by Ayurveda which are dynamic forces of the body, having mutually
opposite properties, yet never remaining apart from each other. This counter-balance mutual properties and actions and are assigned to produce specific actions in the body for the maintenance of health and also for production of diseases. 

Vata is responsible for all movements voluntary or involuntary, and acuity of sensations, consciousness and his moods in Man. Pitta is responsible for heat production and transformation of nutrients into tissues and tissues into exertions. Kapha provides the material to build up and break down and to protect the body from the destructive effects of the former two. Thus Ayurveda took the first step in turning philosophy into science by giving the concept of Tridosha and establishing their utility in practical life. The concept of Tridoshas was applied to living matter and also to inanimate substances of Universe, the planets, seasons and climate, countries and regions. All these have a favourable or unfavourable effects on the living substances through the Tridoshas.

The similarity and dissimilarity between substances was recognised. This was termed as Samanya and Vishesha. Similarities and dissimilarities were based either on common constituents or on qualities and attributes or functions i.e., Dravya, Guna and Karma. Dravyas are carriers of Gunas and Karmas and also of the similarity and dissimilarity. These are inseparable from the Dravya, i.e. Samavaya. This is how the relation of matter and energy, substances and properties is described in ancient Indian Shastras. Thus six categories of Vaisheshika were adopted in Ayurveda. According to Samkhya philosophy, by the compact of Chetana Purusha three forms of energy dormant in unmanifest primordial matter (Ayuakta or Prakriti) become manifest in the form of a triad of Satwa—consciousness or knowledge, Rajas—motion or action, and Tamas or inertia, resisting the former two; called Triguna. They were transmitted in all subsequent evolutes and later creations, but in living substances, because of their origin from Satwa, consciousness and activity were apparent; while in non-living substances inertia was apparent because of their origin from Tamas. Even in living creatures consciousness and activity become more and more refined according to gradations of the property of Satwa. These Gunas are manifest in human beings in their temperament, constitution and beha-
viour which constitute the personality (*Manas prakriti*). *Tridoshas* are more manifest in body tissues and in the functions of *Doshas, Dhatus* and *Malas* (*Deha prakriti*).

**Constitution and Personality:**

Prakriti is formed according to the predominance of Doshas and Gunas in a person giving him his particular constitution. It is determined at the very moment the fertilization takes place. The factors which carry peculiar, good or bad qualities of body and mind are contained in the sperm and the ovum and after they mingle the product of the admixture results with the prominence of one or more Doshas along with inherited characters from the father and mother. Mental properties and intellect are even subtler and thought to be transmitted in new life from previous birth along with Atma. Disturbance of minute factors contained in the sperm or the ovum were recognised to be the cause of defective development and hereditary and congenital diseases. *Tridoshas* are factors which govern the life processes in all conditions and stages.

All processes of life right from conception to death are nothing but manifestations of regulated activities of three Doshas and three Gunas. However, *Kapha* is dominant in first ¼ of life i.e. Balya, *Pitta* in second ¼ i.e. *Madhya* and *Vata* in latter ¼ i.e. Jara which are periods or phases of growth, maintenance and decline respectively. *Samanya* and *Vishesha* were given practical utility in Ayurveda. *Kshaya* and *Vriddhi* (decrease or increase) i.e. growth and decline is in the very nature of living substance. These changes were logically related to *Samanya* and *Visesa* by Ayurveda. Growth is due to the inclusion of similar factors and decrease is due to intake of dissimilar factors or exclusion of similar factors. In this way three *Gunas*, five *Bhutas*, *Tridoshas*, *Samanya*, *Vishesha* and *Dravya Guna* and *Karma* were applied in the study of *Cetanā* and *Acetana dravyas* and their use in the study of the problems of health and diseases is the evidence of practical shape given to philosophical concepts by Ayurveda.
Concept of Samya and Vaishamya—Health and Disease:

The Doshas are not static, do not remain constant but they are ever changing with the slightest provocation from outside or inside. They are either excited or depressed in their quantity or quality or both. This is called Vaishamya i.e. imbalance. Imbalance is an automatic natural process, that is why one has to be vigilant to keep the proper balance and maintain equilibrium by creating appropriate conditions. Here comes the question of Ahara—Nutrition, Saimyee-karamya—assimilation, Paka—conversion by Agni, production of Prasad dhatu and Kittadhatu i.e. Anabolism and Katabolism. Dhatusamya is Health, Dhatuvaishamya is disease. Doshas are the first to get disturbed as a result of provocation and then they either neutralise the effects of provocation or transmit the disturbance to the Dhatus and Malas. Doshas act like buffers. Unless Doshas are disturbed there will be no disease. Thus the question of resistance or susceptibility comes to the forefront, which is based on the inherent capacity of Doshas and Dhatus in an individual to react to a trauma in a particular way.

Concept of Bala and Ojas:

Concept of Ojas is a principle related to the question of resistance, one of the peculiarities in the fundamentals of Ayurveda. It is a very subtle all pervasive factor in the body, the vital force or essence being carried along with and transmitted through the sperm and ovum and constantly replenished by the supply of proper nourishment and observance of rules of conduct. It is this force which enables life to continue despite hazards. Exhaustion of this vital essence leads to death. Strength, Stamina, Vigour—which are called Bala in Ayurveda are related to and are the direct outcome of Ojas.

The concept of Ama:

The concept of Ama is another such peculiarity. By the proper functioning of Agni at the respective stages, food is
transformed into the constituents of tissues and organs Dhatus; and a normal amount of effect matter Mala is produced and excreted. If Agni gets faulty in any way, the resultant transformation will be defective and some abnormal products of incomplete digestion or of abnormal reaction which vitiate the body are formed and are ultimately rejected. Such abnormal products are called Ama. This is the process at the base of every type of disease excepting those which result from direct trauma (Agantu Abhighata).

These are some of the salient points which are meant to give one a glimpse into the fundamentals of Ayurveda on which the whole body of knowledge of preservation of health treatment of diseases stands. These are Prameyas or objects to be studied in Ayurveda. Next come the Pramanas or means of knowledge which help us in the study of Prameyas.

Pramanas—the Means of Knowledge

The urge to acquire knowledge is called Eshana in Ayurveda. Pramanas are the means of investigation of Prameyas and the result or such investigation is knowledge of Sat or Asat (Real or False: Positive evidence or negative evidence) Hindu Sashtra have drawn no limit to the objects to be recognised or things to be investigated. To them, the whole universe (of which man is but a tiny fraction) is the object of investigation because therein lie the causes of pain and pleasure. A substance or an event should be studied in order to know its origin, its ultimate end, its constitution, its nature and its application and the purpose lying hidden behind it. Each and every object—be it a part of our environment or a part of our own being i.e. physical world surrounding a living matter or abstract substance beyond the reach of our sense organs—becomes the object of our study. For an Ayurvedist, Ayu i.e. Purusha, Vyadhi, Sukha and Dukkha with their cause and drugs which are wholesome to Ayu or otherwise are the objects of his study.

In Ayurveda, everything pertaining to man—both external and internal, physical and mental, direct and indirect—falls within the purview of the study of man. Thus we find that Ayurveda probes into the deep recesses of the human mind
and also concerns itself with the mysteries of outer space; again it studies the functions of the human body in as much detail as it does the flora and fauna or the social milieu and the physical environment. The subject matter of our study have been summed up in two words \textit{Loka} and \textit{Purusha} or in the two \textit{Eshanas} Viz—\textit{Prana Eshana} and \textit{Dhana Eshana}. Both of them have been recognised to be vast and deep, unlimited and unfathomable. Both \textit{Purusha} and \textit{Loka} have been described to be \textit{Anantavayava}. If they are to be studied in every detail, we should have the appropriate means to do so. That is why not only \textit{Pratyaksha} but \textit{Anumana} is also used as a means of knowledge. There is one more \textit{Eshana} which is called "\textit{Paralok Eshana}" which deals with the world beyond, to be achieved after death. For this no direct proof is available and we have to put faith in or rely on the words of worthy persons i.e. \textit{Aptopadesha}. Some of these objects may fall within the ambit of (1) our senses of direct observation—i.e. the 5 types of \textit{Pratyaksha} visual etc. sensations. This is \textit{Laukika Pratyaksha} used by the layy. Those objects which may be very minute are out of the reach of the capacity of our sense organs and (2) \textit{Anumana}—inference is the only means of their recognition. \textit{Anumana} is of 3 types—(i) From gross product to infer its minutest constituents is called \textit{Karyat Karananumanam} or \textit{Sheshavat Anumanam} (ii) From minute cause to infer final product is \textit{Karanat Karyanumanam} or \textit{Poorvavat Anumanam}. (iii) Where there is no relation of casualty, yet constant co-existence between two events is obvious, the \textit{Anumanam} is—\textit{Samanyaatordrishta} i.e. simple co-relation or the rule of invariable co-existence of two related substances. It may be based on positive co-existence or negative co-existence or both called \textit{Anvayavyatireka} and \textit{Anvaya-Vyatirek Vyapties} respectively. For reliability and validity, both \textit{Pratyksha} and, \textit{Anumanam} should be free from fallacies and doubts. That is why (3) \textit{Aptopadesa} should be at the base of both of them. Some objects even elude the above two means, then we have to take recourse to the statements of knowledgable persons—i.e. \textit{Aptopadesa}. \textit{Aptas} are persons who have acquired the knowledge directly through extra-ordinary or super natural means. By sheer dint of being selfless and devoted, devoted to the greater good of all, they desist from the slightest of evils, their \textit{Rajas} and
Tamas which interfere with intellect in revelation of truth have been expunged and the intellect has become crystal clear to realise the truth directly without the aid of external senses. This is called Yogaj or Alaukik Pratyaksha or Pratibhajnana, Divya Chakshu or Dhyana Chakshu or Tapas Chakshu, the capacity of which is unlimited and boundless as regards time and place. While perception through ordinary senses is called Mansa Chakshu and is very limited to the present moment only and confined to limited space and form. Sound knowledge and trustworthy information about the methods, procedures, techniques and parameters to ward off fallacies and doubts are derived from the authorities who have had direct experience and have examined them critically and experimentally before establishing their truths. Such authorities in the form of text books, teachings and reports, facts, figures and formula and charts and tables, standards and norms established by knowledgeable persons are used as parameters of truth. They become guidelines for junior workers for observations and inferences in experiments and research and are relied upon even to-day.

That is why in our Shastras the above referred three methods are given credence to as reliable means of knowledge and given primary importance on other means such as Upamana (Simit), Arthapati, Anupalabdhi, Sambhava, Aitihya, Ganita etc. They are nothing but modifications of these major means and methods. They are also approved but have a secondary position.

Pratyaksha or direct observation is considered to be most potent and the best method of knowledge because here knowledge is derived from the contact of sense organs with the objects. And, once we get direct knowledge our query is satisfied fully. In other two methods full satisfaction is not derived even after getting convincing proofs and putting full faith in assurances. A desire to have direct contact with the fact still remains there; but as there is a limit to the capacity of our sense organs for acquiring this direct knowledge and a limit to our power of reasoning and skill and intellect, we have to take recourse to Anumana and Aptomadesha. Beyond a certain limit of size or distance or of frequency of waves of lights and sounds, the same sense organs are not able to
perceive the objects. Further the perception through sense organs may be interfered with by external or internal factors such as minuteness in size, shape, distance of the object too far or too near, overlapping of two objects of the same type, lack of concentration of mind, some defect in the sense organs themselves etc. Only in the absence of such interfering causes is direct observation possible and the knowledge reliable. However, it has become possible to overcome some interference and to increase the capacity of different sense organs, now-a-days, by application of appropriate aids to respective sense organs—e.g. Audio Visual apparatuses of extra-ordinary precision and sharpness like highly-powered Microscopes and Telescopes, X-Rays, Radar etc, for eye; Microphone, Radio Receiver and Megaphone etc, for ear; P.H. meter and Litmus paper for tongue, Viscometer, Weighing machine and Thermometer & Pyrometer, Hydro-meter etc; substitutes for skin and touch sensations. These either increase the power of the senses or they replace the use of sense organs and indirectly give the same information. They all may be included as the modern examples of “Alaukika Pratyaksha” (not commonly used or known by the laity and where expert knowledge is required).

These above mentioned means are utilised in the identification of drugs and verification of their properties and actions; in investigation of a disease and pathological conditions for the sake of correct diagnosis; and for judging the constitutions and temperaments of persons and standards of health in healthy persons; for preparations of foods and drugs in the processes of cooking and pharmaceuticals, and for practising Yoga and attainment of blissfull conditions i.e. Moksha, i.e. in all spheres of activities where accuracy in knowledge is essential. They are the means of Prama or reliable knowledge regarding any object situated either in Purusa or loka.
A BIRD'S-EYE VIEW OF ANCIENT INDIAN SURGERY

G.D. SINGHAL

The ancient Indian medical literature, Ayurveda, is available in Sanskrit in three main treatises of Charaka, Sushruta and Vagbhatt and several smaller treatises like Madhava-nidana, Sarangadhara-Samhita, etc. India's rich medical heritage is now beginning to be appreciated in the West also, as authentic research-oriented English versions of these classics are being made available to the world by the scholars of Banaras Hindu University. 1-15.

Sushruta, the Father of Surgery, learnt, lived and practised Surgery in Varanasi about 2500 years ago where he wrote his classical Ayurvedic surgical treatise, Sushruta Samhita in Sanskrit in 186 chapters in 6 cantos. a most exhaustive medical work covering all aspects of surgery and allied sciences. The great work remained unrecognised so far due to its non-availability in the modern language. Now that its only authentic, scientific, research-oriented English syntax interpretation in the form of a 12 volume (over 500 pages) Ancient Indian Surgery series is being brought out by a team of over 20 Ayurvedic and modern doctors from the Institute of Medical Sciences, Banaras Hindu University, it is changing the History of Medicine, giving new ideas for research and encouraging their clinical applicability.

Based on the above monumental encyclopaedic work, a bird's-eye view of the canto and chapterwise contents of Sushruta Samhita is being given below.

The First Canto is called Sutra-sthana\(^1\) and contains 46

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chapters on the fundamentals of Ayurveda, plastic surgery and pharmaceuticals.

Chapter 1 (The Origin of the Medical Science): Sushruta and six other disciples learn from their preceptor, Lord Dhanvantri, that Ayurveda is a sub-division of Atharvaveda, the fourth Veda. Brahma, the God of creation realising that human beings would fall also sick, enunciated Ayurveda even before He created them. A succession of teachers followed from Brahma to Dhanvantari.

Ayurveda is classified into 8 branches, viz. Surgery, Ophthalmology and Otorhinolaryngology, Medicine, Psychiatry, Paediatrics, Toxicology, Geriatrics and the Science of Fertility and Virility.

Ayurvedic management is based on 4 pillars—the patient, the disease, the medical and surgical procedures, and timely activity.

Chapter 2 (Students Initiation Ceremony) corresponds to the premedical test of modern times with the induction of the student into the medical career with full Vedic rites. The reciprocal code of conduct between the teacher and the taught is explained. The ethics of medical study and treatment are also discussed.

Chapter 3 (Index of the Treatise) gives the Sanskrit titles of all chapters of Sushruta Samhita, cantonwise. (This ensures that even if the first few pages of the manuscript are lost, the index of the treatise would still be available.)

It ends by laying equal emphasis on the theoretical and practical knowledge and compares them singly to a one-winged bird or a war chariot with one wheel only.

Chapter 4 (Interpretation) stresses two important methods of study, to understand a subject properly and not just cram it up, and also to study the sciences related to medicine.

Chapter 5 (The Pre-operative Arrangements) classifies all surgery into pre-operative measures, operative procedures and postoperative care. The eight basic surgical procedures to be followed and equipment to be arranged before an operation is given. All aspects of incisions and abscesses are discussed. Post-operative pain-relieving and bactericidal measures, keloid formation and ethics in emergency surgery are mentioned.

Chapter 6 (Seasonal Regimen) deals with all aspects of
seasonal regimen as applied to medicine, specially their effects on body humours in health and disease.

Chapter 7 (The Blunt Instruments) deals with all aspects of the 101 blunt instruments, classified in six groups (24 cruciform, 2 dissecting forceps, 2 spoon shaped, 20 tubular, 28 for probing and 25 accessory instruments), are described, including their manufacture and use.

Chapter 8 (The Sharp Instruments) contains all aspects including their uses, qualities, etc., of the 20 sharp instruments used in ancient Indian Surgery.

Chapter 9 (Experimental Surgery) stresses the importance of experimental surgery in the training of a medical student who was to learn all surgical procedures like incision, excision, etc., on experimental objects like filled urinary bladder of animals, timber, gourd, and so on.

Chapter 10 (Entry into The Profession) outlines the conditions before actual medical practice could be started; external appearances and behaviour of the doctor during visits and the method of case-taking to arrive at a diagnosis and prognosis.

Chapter 11 (The Preparations and Uses of Caustics) considers the pharmacology and therapeutics of Ksharas (caustics) for external use or internal administration.

Chapter 12 (The Method of Cauterization including burns) deals with five cautery treatment and the classification of burns into four degrees (long before Dupuytren's!) and its management, as also with smoke poisoning, heat-stroke, sun-stroke, frost bite and electric and thunder lightning burns.

Chapter 13 (The Therapeutic Application of leeches) deals with all aspects of the leeches and their therapeutic use in letting out the vitiated blood from human beings.

Chapter 14 (The Description of Blood) considers formation, circulation and functions of blood, features of normal and vitiated blood and various aspects of surgical blood letting.

This is a very important chapter for surgeons and physicians from the research point of view today, as it gives various recipes to increase the blood flow by decreasing coagulation and capillary retraction and to cause haemostasis by four methods.

Chapter 15 (Normal, Hypo and Hyperactivity of Doshas,
Dhatus and Malas) discusses matters in this chapter what is fundamental to understanding the basic concepts of Ayurveda regarding Doshas, Dhatus and Malas in health and disease. Bala (Ojas, natural immunity), obesity and asthenia are also discussed and Guggulu (a proven antiobesic and anticholesterol agent) a recipe is mentioned.

Chapter 16 (Plastic Surgery of the Ear, the Nose and the Lip) contains the description of the ancient Indian method of rhinoplasty. It also describes the method of piercing children's ear lobules for ornamental purposes, 15 methods of plastic repair of the split ear lobule, raising cheek flaps, and the principles of cleft lip surgery, among others.

Chapter 17 (Inflammations and Abscesses) describes all aspects of the six types of inflammations and the three types of abscesses.

Chapter 18 (Dressing of Wounds with Pastes and Bandages) deals with the application of pastes (thick, thin or of moderate consistency) and bandages (14 methods) over wounds.

Chapter 19 (Care of the Wounded) deals with all aspects of the management of the wounded including a traumatic ward, avoiding harmful organisms (? bacteria), antiseptic substances, measures for quick healing, and other allied matters.

Chapter 20 (Salutary and Unsalutary Diets and Regimen) deals with the salutary and unsalutary diets and regimen for the patient, harmful dietary combinations and the effects of winds blowing from different directions.

Chapter 21 (The Problem of Tridoshas in the Wounds) is very important from the Ayurvedic point of view to understand the concept of Doshas (Vata, Pitta and Kapha) in health and their six stages to produce disease.

Chapter 22 (The Curable and Incurable Lesions) classifies the causes, sites and natures of the curable, relievable and incurable lesions, specially ulcers. Systemic diseases as diabetes, leprosy, toxemia and consumption are specifically mentioned as causes of incurability.

Chapter 23 (The Ulcerative Lesions and their Discharges) describes the local features of the various types of ulcerative lesions.

Chapter 24 (The Classification of Diseases) gives a broad classification of diseases into the medical and the surgical
ones. All these could be psychosomatic (hereditary, congenital or humoural), traumatic or natural (seasonal, epidemic or humoural), traumatic or natural (seasonal, epidemic or physiological). Various diseases caused by the vitiation of each of the seven dhatus are mentioned to be described in detail in Uttara-tantra, the sixth canto.

Chapter 25 (The Eight Surgical Procedures) deals with the indications of the eight surgical procedures and details of suturing.

Chapter 26 (The Deep Seated Foreign Bodies) and
Chapter 27 (Extraction of the Foreign Bodies) (26, 27) deal with the diagnosis and management of the two types (endogenous like teeth, hairs, nails, etc, and exogenous like arrow, straw pieces, etc.) of foreign bodies in a patient.

Chapter 28 (Wounds of a Good or Bad Prognosis)
Chapter 29 (The Unfavourable and Favourable Messengers and Dreams)
Chapter 30 (Bad Omens of the five Special Senses)
Chapter 31 (Bad Omens of the Complexion)
Chapter 32 (Bad Omens in the Natural Constitution)
Chapter 33 (The Untreatable Diseases) describe the various features which indicate a good or a bad prognosis, e.g. gas and crepitation (gas gangrene) in the subcutaneous tissues (Ch. 28).

Chapter 34 [The Well Equipped Army (War Surgery)] discusses the surgeon's role in the war camp, specially in protecting the king and his army from the enemy.

The four pillars of success described are: good clinician, good patient, good medicine and good nursing attendant.

Chapter 35 (Commencement of the Treatment of the Patient) deals with such prognostic factors as life expectancy, age, general health, season, etc. to be considered before starting the treatment.

Chapter 36 (The Classification of Soils) deals with all aspects of soils from which medicinal herbs were to be collected and with the storage of the latter.

Chapter 37 (The Miscellaneous Remedies) classifies the drugs and measures for the treatment of inflammations, abscesses and wounds.

Chapter 38 (The classification of Drugs) classifies the drugs
into 37 groups giving their heading, constituent members, properties and uses.

Chapter 39 (The Drugs for Dosha Elimination and Alleviation) lists the Dosha-eliminating and Dosha-alleviating drugs and their dosage schedules.

Chapter 40 (A Study of the Drugs, Their Tastes, Properties, Potencies and Final Taste after Digestion)

It discusses the controversy between the importance of drugs, their tastes, potencies, properties and final taste; ultimately drugs are considered to be of supreme importance.

Chapter 41 (A Special Study of the Drugs) describes the interrelationship between the origin of the drugs, their properties and functions as well as the bodily Doshas with the Panchamahabhutas.

Chapter 42 [A Special Study of the Rasas (Tastes)] deals with all aspects of the 6 tastes in the drugs and their interrelationship with the Doshas.

Chapter 43 (The Emetic Drugs) deals with the pharmacology and therapeutics of the 6 special emetic drugs, Madana fruit being the best.

Chapter 44 (The Purgative Drugs) deals with various root, fruit, oil and latex purgatives and their preparations and uses.

Chapter 45 (Types of Liquid Substances and their Properties) deals with all medicinal aspects of the ten liquid substances, viz, water, milk, yoghurt, buttermilk, Ghrita, oil, honey, sugarcane juice, wine and urine.

Chapter 46 (Dietetics), the biggest chapter of the treatise deals with all aspects of dietetics. The dietary articles are described under 12 broad groups as the cereals, the meat group, the fruit group, the vegetables, the flowers, the tubers, the salt group, the metals, the precious stones, the group of prepared food, confectionaries and after-drinks. The kitchen and dietary regimen as well as applied aspects of indigestion are also discussed.

The Second Canto

It is called Nidana—sthana and contains 16 chapters on the diagnostic features of diseases as mentioned below.

Chapter 1 (The Diagnosis of Vatika Diseases) deals with all
aspects of the basic Ayurvedic concepts of *Vata* (*vayu*), the first *Dosha* or bodily humour, both in health and disease. The diseases produced by vitiated *Vata* include goat convulsive disorders, neuralgias, palsies, bladder pain, abdominal distension, prostatic enlargements, etc.

**Chapter 2 (The Diagnosis of Piles)** describes all aspects of the diagnosis of anal piles and mentions piles like fleshy excrescences in other parts of the body such as over male genitalia (? carcinoma), umbilicus (? granuloma), female genitalia (? venereal warts), etc.

**Chapter 3 (The Diagnosis of Urinary Calculi)** deals with the the anatomical and physiological considerations of the urinary bladder and all aspects of the diagnosis of the four common types of the vesical calculi and of seminal concretions and urinary gravel.

**Chapter 4 (The Diagnosis of Fistula-in-ano)** deals with the diagnosis of the five types of fistula-in-ano and of anorectal abscess and perianal boil.

**Chapter 5 (The Diagnosis of Skin Diseases (Including Leprosy))** describes the diagnostic features and complications, etc. of the seven major and the eleven minor skin diseases (including leprosy) and the three types of leucoderma. It also describes the mode of spread of contagious diseases.

**Chapter 6 (The Diagnosis of Urinary Abnormalities)** deals with the diagnostic considerations of the twenty urinary abnormalities and the ten types of associated boils.

**Chapter 7 (The Diagnosis of Abdominal Enlargements)** deals with the aetiology, pathogenesis, clinical features and prognosis of the eight types of abdominal enlargements including intestinal obstruction, perforation, splenomegaly and ascites.

**Chapter 8 (The Diagnosis of Abnormal Foetal Presentations)** discusses the aetiopathogenesis, diagnosis and prognosis of the eight types of foetal malpresentations (including breech, transverse and extremities presentations), differentiates between normal labour, abortion and miscarriage and mentions caesarian section to save the child.

**Chapter 9 (The Diagnosis of Abscesses)** deals with the diagnostic considerations of external abscesses of six types and with internal abscesses, including puerperal sepsis and acute osteomyelites.
Chapter 10 (The Diagnosis of Spreading Cellulitis, Sinuses and Breast Diseases) deals with the diagnosis of various types of cellulitis (including crysepalas) and sinuses. It also describes milk secretion, normal and vitiated milk and the diagnosis of breast abcesses.

Chapter 11 (The Diagnosis of Glandular Swellings, Cervical Lymphadenopathy, Tumours and Goitres) deals with the diagnostic considerations of various types of swellings mainly in the neck such as lymphadenitis, tumours and goitres. (Some of the swellings described resemble sebaceous cyst, lipoma, tubercular cervical lymphadenopathy, retrosternal goitre, thyroid carcinoma, goitre with myxoedema or thyrotoxicosis, etc.

Chapter 12 (The Diagnosis of Scrotal Swellings, Veneral Diseases and Elephantiasis) describes the diagnosis of seven types of scrotal and inguino-scrotal swellings (including hernia, hydrocele and filarial scrotum), five types of venereal diseases and three types of elephantiasis.

Chapter 13 (The Diagnosis of Minor Diseases) deals with the diagnosis of 44 unclassified miscellaneous diseases mostly visible on the skin (haemangiomata, corn, callosity, generalised eruptions, carbuncle, dermoid and sebaceous cysts, whitlow, paraphimosis, pimples, neurofibromatosis, etc.)

Chapter 14 (The Diagnosis of Shuka Diseases) deals with the aetiology, clinical features and prognosis of 18 infective, traumatic and neoplastic lesions of the penis produced by the local applications of water moss in the belief of elongating it.

Chapter 15 (The Diagnosis of Fractures and Dislocations) deals with the aetiology, clinical and prognostic features of the 12 types of fractures and 6 types of dislocations, including a separate mention of pathological fractures.

Chapter 16 (The Diagnosis of OraI Diseases) deals with the diagnosis of 65 diseases of the oral cavity (8 of the lips, 15 of the gums, 8 of the teeth, 5 of the tongue, 9 of the palate, 17 of the throat and 3 generalised oral cavity diseases.)

Third Canto

This is called Sharira-sthana and contains 10 chapters on the foetal development and anatomy, philosophy of the soul and the Universe, anatomy of the human body and certain
applied aspects, and the care of the pregnant and the newborn.

Chapter 1 (Physical and Metaphysical Aspects of Living Beings) deals with the Indian philosophical viewpoint regarding the origin of Universe in general and living beings in particular and with their applied Ayurvedic aspects.

Chapter 2 (Anatomical Considerations of the Normalement of the Sperms and Ovum) deals with the normal and abnormal features of seminal discharge and menstrual flow, treatment of their disorders, regimen for begetting a male or a female child, impotents and certain aspects of foetal abnormalities.

Chapter 3 (Fertilisation and development of the Foetus) deals with conception, monthwise development of the foetus, sex differentiation, ante-natal care, pregnancy longings and related aspects.

Chapter 4 (Details of the Foetal Anatomy) deals with the formation of the seven layers of the skin and their applied aspects, the seven internal supporting layers and the hollow and solid viscera. It also discusses physicopathological aspects of sleep and human constitutions.

Chapter 5 (Enumeration of the Anatomical Parts of the Body) deals with the steps of foetal development, enumeration of the anatomical parts of the body and their subdivisions of muscles, joints, bones, etc. and with the importance and method of dissecting a cadaver.

Chapter 6 (Anatomical Considerations of the Individual Vulnerable Areas) deals with the 107 vulnerable areas or marmans (which could possibly be compared with acupuncture points), their 3 methods of classification and their description, importance and effects of injury.

Chapter 7 (Anatomical Considerations of the Veins, their Divisions and Colour) deals with the distribution and classifications of the 700 veins of the body, the principal and dosha-carrying veins and with the veins which have been contraindicated for venepuncture.

Chapter 8 (The Techniques and Anatomical Considerations of Venepuncture) deals with venepuncture, its indications, contraindications, pre-and post-operative care, good and bad bleeding and with all other aspects of venepuncture.

Chapter 9 (Anatomical Considerations of the Dhamanis) deals
with the anatomical and physiological considerations of the *Dhāmanis* (arteries) and *Srotasas* (channels such as food-carrying, urine carrying, etc.) and their differentiation from the *Siras* (veins).

Chapter 10 (*Anatomical Considerations and Care of the Pregnant*) deals with all aspects of the ante-natal, natal and post-natal care of the mother and also with the care of the newborn.

The Fourth Canto

This is called *Chikitsa-sthana*. It consists of 40 chapters which describe the treatment (both operative as well as non-operative) of various diseases.

Chapter 1 (*Management of the Two Types of Ulcerative Lesions*) describes the clinical features of wounds and ulcerative lesions (of two types, viz. endogenous due to vitiated *dosas* and exogenous due to trauma) and their management by sixty very useful medical and surgical therapeutic procedures.

Chapter 2 (*Management of the Recent Traumatic Wounds*) describes the features, classification and management of the 6 types of recent traumatic wounds, viz. excised, stab, punctured, lacerated, crushed and abraded wounds.

Chapter 3 (*Management of the Fractures and Dislocations*) deals with the general (diet, regimen, etc.) and local (reduction by traction, pressure, apposition or bandaging and immobilisation by splints, fracture board, etc.) management of skeletal and joint injuries. It also describes the treatment of compound fractures and a large number of specific fractures and dislocations, osteoclasis for malunion and recipes to promote fracture healing, etc.

Chapter 4 (*Management of the Vatika Diseases*) deals with the eliminative therapies and other measures for the treatment of non-serious general or local *Vatika* diseases.

Chapter 5 (*Management of the Serious Vatika Diseases*) deals with all aspects of the management of gout and other serious *Vatika* diseases. The (anticholesterolaemic) drug *Guggula* as a specific antiobesic agent has been described.

Chapter 6 (*The Management of Piles*) deals with all aspects
of the four types of the management of piles, viz. medicinal, chemical cautery (caustics), fire cautery and surgery. It also describes a standard diagnostic rectal speculum, technique of retal operations litholomy position, etc.

Chapter 7 (The Management of Urolithiasis) deals with the medicinal and surgical management of various types of urinary calculi (including perineal lithotomy for vesical calculi) and gravel along with their complications.

Chapter 8 (The Management of Fistula-in-ano) deals with all aspects of the surgical and medicinal management of fistula-in-ano.

Chapter 9 (The Management of Skin Diseases including Leprosy) deals with the management of various skin diseases including leprosy, ringworm and leucoderma (by diet and daily regimen, eliminative procedures, drugs, surgery, hydnocarpus and other oil recipes, etc.)

Chapter 10 (The Management of Serious Skin Diseases, including Serious Types of Leprosy) deals with the various pharmacological preparations for the management of leprosy and other serious skin diseases, Kapha, general anasarca and obesity.

Chapter 11 (Management of the Urinary Abnormalities) deals with the management of various urinary abnormalities including diabetes (of two types, hereditary and acquired), chyluria, haematuria, etc.

Chapter 12 (The Management of Boils associated with Urinary Abnormalities) deals with the management of boils and ulcers associated with urinary abnormalities (including those with glycosuria of diabetes mellitus).

Chapter 13 (The Management of Glycosuria) deals with the management of advanced cases of diabetes mellitus by silajatu and leprosy, etc. by hydnocarpus oil.

Chapter 14 (Management of the Abdominal Swellings) deals with the surgical and medical management of various diseases manifested by the common present symptom of abdominal enlargement, such as splenomegaly, hepatomegaly, intestinal obstruction and perforation, ascites, etc. by laparotomy, paracentesis and other meaures.

Chapter 15 (The Management of Abnormal Foetal Presentations) deals with the general, manipulative and surgical
(craniotomy, evisceration, etc.) management of foetal mal presenta
tions, with or without obstructed labour, manual removal of retained placenta and puerperal regimen.

Chapter 16 (The Management of Abscesses) deals with the management of acute inflammation, external and internal abscesses and of osteomyelitis by plasters, poultices, incision and drainage, etc.

Chapter 17 (The Management of Spreading Cellulitis, Sinuses and Breast Diseases) deals with various types of cellulitis (by local and general measures), sinuses (by recipes, excision of the track or alkaline caustic thread treatment) and breast abscesses (by medicines, incision and drainage), etc.

Chapter 18 (The Management of Glandular Swellings, Cervical Lymphadenopathy, Tumours and Goitres) deals with the management, both surgical and medical, of glandular swellings (including cysts), cervical lymphadenopathy, tumours and goitres.

Chapter 19 (The Management of Inguino-scrotal Swellings, Veneral Diseases and Elephantiasis) deals with the surgical and medical management of the various types of inguinoscrotal swellings, veneral diseases and elephantiasis.

Chapter 20 (The Management of the Minor Diseases) deals with the medical and surgical management of the various unclassified minor diseases, mostly of the skin and its appendages.

Chapter 21 (The Management of (Penile) Shuka Diseases) deals with the management of the various penile Shuka dosha lesions.

Chapter 22 (The Management of the Diseases of the Oral Cavity) deals with the management of the diseases of the oral cavity, including those of the lips, gums, teeth, tongue and the palate.

Chapter 23 (The Management of General Anasarca) deals with the diagnosis, prognosis, and management of the five types of general anasarca by specific recipes and other medical measures, etc.

Chapter 24 (Prevention of Diseases) describes the ethics and personal hygiene of daily regimen for prevention of diseases.

Chapter 25 (The Management of Disorders) deals with the
management of certain miscellaneous diseases, viz. diseases of the ear lobule, greying of hairs and pigmentation of the face.

Chapter 26 [The Aphrodisiac Treatments for the (Sexually Weak)] gives the definition and scope of aphrodisiac therapy, causes, classification and 6 types of impotency, and a number of powerful, exhilarating, antisterilitic and aphrodisiac recipes.

Chapter 27 (General Restorative Treatments for All Disorders) deals with various restorative remedies (Rasayanas) for the alleviation of all ailments.

Chapter 28 (The Restorative Therapy for Promoting Intellectual Sharpness and Longevity) deals with the various restorative remedies (Rasayanas) to promote wisdom and longevity.

Chapter 29 (The Restorative Treatments for the Prevention of Natural Diseases) deals with the divine ambrosia Soma to prevent old age and death. Its 24 varieties, their nature, effects and all other aspects are given.

Chapter 30 (Restorative Treatment to Remove the Distress) describes 18 restorative drugs and all aspects of their mode of usage for persons whose afflictions have already been removed.

Chapter 31 (Oleation Therapy) deals with all aspects of internal and external alteration therapy with Ghrita, oils, etc.

Chapter 32 (Sudation Therapy) deals with all aspects of the four types of (local or general) sudation therapy, viz. dry heat, vapour fomentation, poultice and liquid fomentation.

Chapter 33 (The Management of Ailments Curable by the Emetic and Purgative Therapies) deals with all aspects of the emetic and the purgative treatments as well as the management of their curable complications.

Chapter 34 (The Management of the Complications of the Emetic and the Purgative Therapies) deals with the pathogenesis and the management of the fifteen types of complications of the emetic and the purgative therapies.

Chapter 35 (Specifications of the Enema Treatment and the Nozzles) deals with all aspects of the enema treatment and with the specifications of the enema pipe and bags.

Chapter 36 [The Management of the Complications of the
Enema Treatment Caused by (an improperly used) Netra-basti deals with the management of the complications of the enema treatment by an improperly used enema pipe, enema bag, wrong positioning of the patient, etc.

Chapter 37 (Therapeutics of Oily Enemas and Urethral/Vaginal Irrigations) deals with all aspects of the use of (medicated) oily enemas and urethral and vaginal irrigations.

Chapter 38 (The Schedule of Decoction Enema Treatment) deals with all aspects of the (non-oily medicated) decoction enema treatment.

Chapter 39 [The Treatment of (Undesirable) Side Effects in the Patients (Undergoing Panchakarma Therapies)] deals with the dietary and other management of the undesirable side effects which occur in the patients undergoing panchakarma or elimination therapies, such as enemata, internal oleation, emesis, purgation, blood letting, etc.

Chapter 40 [Treatment by (Medicated) Fumigations, Errhines and Gargles] deals with the therapeutic uses and all other aspects of medicated fumigations, errhines and gargles.

The Fifth Canto

This is called Kalpa-sthana. It consists of eight chapters which deal with poisoning and toxicology.

Chapter 1 (The Doctrine of Protection of Foods and Drinks) deals with the ways in which a king could be poisoned through food, drinks or articles of daily use and with their detection, prophylaxis and treatment.

Chapter 2 (The Doctrine of the Science of Inanimate Poisons) deals with all aspects of poisoning by inanimate poisons in general and by Dushivisha, the slow acting cumulative ones, in particular.

Chapter 3 (The Doctrine of the Science of Animate Poisons) deals with all aspects of poisoning by venomous animals, including chemical warfare poisoning, water poisoning, soil poisoning, food and fodder poisoning and atmospheric poisoning.

Chapter 4 (The Doctrine of the Science of Poisoning by Snake Bite) describes the different types of snakes, features and
stages of poisoning by their bites in human beings and animals.

Chapter 5 (The Doctrine of the Management of Snake Bite Poisoning) deals with the management of snake bite poisoning in the human beings, birds and animals. It also deals with arrow poisoning and the management of poisoning by insect bite and rat bite.

Chapter 6 (The Doctrine of the Sounds of a Drum of Anti-Poisonous Virtues) deals with four great anti-poisonous recipes for treating serious terminal stages of poisoning or for treating poisoning of masses of persons, army or cattle and could also be applied on the drums which when beaten produced sound waves having a curative effect.

Chapter 7 [The Doctrine of (Poisoning by) Rats] deals with 18 types of rats and poisoning by their bites in the human beings and animals. It also discusses hydrophobia.

Chapter 8 [The Doctrine of (Poisoning by) Insects] deals with all aspects of poisoning by bite, etc. of insects, frogs, flies, mosquitoes, scorpions and spiders, etc.

The Sixth Canto

This is called Uttara-tantra⁸,⁹,¹⁰ and consists of 66 chapters. It deals with ophthalmology, otorhinolaryngology, head diseases, paediatrics, gynaecology, internal medicine, psychiatry and aphorisms. Salakya-tantra⁸ (Ch. 1-26) Ophthalmology and otorhinolaryngology

Chapter 1 (The Complications) gives the skeletal outline of the contents of Uttara-tantra, anatomical considerations of the eyeball and aetiology, prodromal features and general principles in the management of eye diseases. It then enumerates the seventy-six eye diseases, classified according to the Doshas involved, prognosis and the site of lesion.

Chapter 2 (Study of the Diseases of the Junctional Areas of the Eye) deals with the clinical features of the nine diseases of the junctional areas of the eye.

Chapter 3 (Study of the Diseases of the Eyelids) deals with the nomenclature and clinical features of the twenty-one diseases afflicting the eyelids.

Chapter 4 (Study of the Diseases of the White Part of the
A BIRD’S-EYE VIEW OF INDIAN SURGERY

Eye) deals with the nomenclature and clinical features of the eleven diseases of the white part of the eye.

Chapter 5 (Study of the Diseases of the Cornea) deals with clinical features and prognosis of the four diseases of the cornea.

Chapter 6 (Study of the Diseases Involving All Parts of the Eye) deals with the nomenclature, clinical features and prognosis of the seventeen generalised eye diseases.

Chapter 7 (Study of the Diseases Affecting Vision) deals with the diagnosis of unripe and ripe cataract and the six other serious diseases afflicting the pupil and the lens.

Chapter 8 (Classification of Treatment of Eye Diseases) deals with the classification of the surgical treatment applicable to the eye diseases, based upon prognosis.

Chapter 9 (Management of Vatabhishyanda) deals with the treatment of Vatabhishyanda and other Vatika afflictions of the eye.

Chapter 10 (Management of Pittabhishyanda) describes the procedures available for the management of Pittabhishyanda and Pittadhimantha and other curable Paittika afflictions of the eye.

Chapter 11 (Management of Kaphabhishyanda) describes the methods of and treatment available for the management of kaphaja abhishyanda and other curable kaphaja afflictions of the eye.

Chapter 12 (Management of Raktabhishyanda) deals with the management of raktabhishyanda and allied eye diseases.

Chapter 13 (Management of the Diseases in which Scraping is indicated) deals with all aspects of scraping in eye diseases.

Chapter 14 (Management of the Diseases in which Incision is indicated) deals with the management of the five eye diseases in detail in which incision is indicated.

Chapter 15 (Management of the Diseases in which Excision is indicated) deals with the management of the arman and other eye diseases in which excision is indicated as a method of treatment.

Chapter 16 (Management of Entropion) deals with the plastic surgery for entropion (Pakshmakopa) in detail. It also describes the three alternative methods of treatment of the diseases, if surgical repair fails.
Chapter 17 (Management of the Diseases Affecting Vision) deals with the operative procedures and collyriums for the treatment of cataract and management of other diseases of the pupil and the lens.

Chapter 18 (Therapeutic External Applications for the Eye) deals with all aspects of the five therapeutic external ophthalmic applications, viz. Tarpana (lubrication), Putapaka (a kind of poultice), Aschyotana (eye drops), Parishka (irrigation) and Anjana (collyrium).

Chapter 19 (Management of Injuries to the Eye) deals with the management of eye injuries and ophthalmia neonatorum.

Chapter 20 (Study of the Diseases of the Ear) deals with the pathogenesis and clinical features of the twenty-eight ear diseases.

Chapter 21 (Management of the Ear Diseases) deals with the general and local management of the ear diseases.

Chapter 22 (Study of the Diseases of the Nose) deals with the pathogenesis and clinical features of the thirty-one diseases of the nose.

Chapter 23 (Management of the Diseases of the Nose) deals with the management of the diseases of the nose.

Chapter 24 (Management of Common Cold) deals with the aetiology, pathogenesis, diagnosis and treatment of Pratishyaya (corrhyza) including Pinasa.

Chapter 25 (Study of the Diseases of the Head) deals with the aetiology, pathogenesis and clinical features of the eleven types of headache and diseases of the head.

Chapter 26 (Management of the Diseases of the Head) deals with the management of the eleven types of headache and diseases of the head.

Kaumara-tantra® (Ch. 27-38) (Paediatrics and Gynaecology)

Chapter 27 (A study of the Specific Features of the Nine Grahas) deals with the nomenclature, aetiology, clinical features, prognosis and general regimen of affictions of children with the nine Grahas, the superhuman organisms invisibly entering the body of unhygienically kept childern and producing various grave paediatric syndromes.

Chapter 28 (The Management of An Affliction by the Skanda Graha)
Chapter 29 (The Management of An Affliction by the Skandapasmara Graha)

Chapter 30 (The Management of An Affliction by the Shakun Graha)

Chapter 31 (The Management of An Affliction by the Revati Graha)

Chapter 32 (The Management of An Affliction by the Putana Graha)

Chapter 33 (The Management of An Affliction by the Andhaputana Graha)

Chapter 34 (The Management of An Affliction by the Shitaputana Graha)

Chapter 35 (The Management of An Affliction by the Mulchamandika Graha)

Chapter 36 (The Management of An Affliction by the Naigamesha Graha)

These 9 chapters (Ch. 28-36) deal with the management of children afflicted with the respective Grahas by such measures as Dosha alleviating medications, fumigations, sacrificial rites, medicated sprinkling, massage, Ghrita and warding off of omens, etc.

Chapter 37 (The Mythological origin of the Grahas) describes the mythological basis of the origin of the 9 Grahas which were created by the gods to afflict the children of unpious and unhygienic families.

Chapter 38 (The Management of the Gynaecological Disorders) deals with the aetio-pathogenesis, clinical features, prognosis and management of 20 gynaecological disorders as dysmenorrhoea, amenorrhoea, dyspareunia, prolapse uterus, habitual abortion, sexual insatiability, cervical growth, pinhole cervical os, etc.

Kaya-Chikilsa10 (Ch. 39-59. Medicine)

Chapter 39 (The Management of Pyrexia) is a chapter which deals with fever as a disease in all its aspects as definition, classification, aetiopathogenesis, clinical features, prognosis and management, etc. Special types of fever as intermittent or that after psychic trauma are described separately. A very interesting concept of treating rigor with fever has been given by such warming measures as sex, etc.
Chapter 40 (The Management of Diarrhoea) deals with all aspects of diarrhoea. It also describes many antidiarrhoea recipes, and special conditions like painful diarrhoea, bloody diarrhoea and Grahani roga or chronic diarrhoea.

Chapter 41 (The Management of Consumption) deals with the definition, classification, aetiopathogenesis, clinical features and the management of consumption.

Chapter 42 (The Management of Gulma) deals with Gulma, an intra-abdominal swelling, basically gaseous in nature and moving within the intestinal tract and with abdominal colics.

Chapter 43 (The Management of Heart Diseases) deals with all aspects of the four types of heart diseases, three Dosika and one Krimija.

Chapter 44 (The Management of Anaemia) deals with the aetiopathogenesis, classification, clinical features and management of the anaemias, jaundice and allied conditions.

Chapter 45 (The Management of Haemorrhagic Diseases) describes the aetiopathogenesis, two principal types, clinical features, prognosis, complications and the management of haemorrhagic diseases.

Chapter 46 (The Management of Fainting) deals with the aetiology, pathogenesis, classification, clinical features and the management of fainting and coma.

Chapter 47 (The Management of Excessive Drinking) deals with excessive drinking, consumption of wine and related aspects, types of intoxication and their specific and symptomatic treatment.

Chapter 48 (The Management of Polydypsia and Dehydration) deals with the definition, aetiology, pathogenesis, clinical features and management of the seven types of thirst as a disease.

Chapter 49 [The Management of (Hyper) Emesis] deals with the etiology, pathogenesis, clinical features and management of the six types of excessive vomiting as a disease.

Chapter 50 (The Management of Hiccough) deals with the diagnosis and management of five types of hiccough as a disease; various useful snuffs, errhines and specific recipes, etc. are described.

Chapter 51 (The Management of Dyspnoea and Asthma) deals with all aspects of dyspnoea and asthma. Several useful recipes are described.
Chapter 52 (The Management of Cough) deals with the aetiology, pathogenesis, characteristics and management of five types of cough as a disease.

Chapter 53 (The Management of Hoarseness of Voice) deals with the aetiopathogenesis, types, clinical features, prognosis and management of six types of hoarseness of voice as a disease.

Chapter 54 (The Management of Worm Infestations) deals with the classification, clinical features and management of worm infestations.

Chapter 55 (The Management of Udavarta) deals with the pathogenesis, clinical features and management of 14 types of Udavarta (diseases caused by suppression of physiological urges such as the passage of flatus, faeces, urine, etc.).

Chapter 56 (The Management of Gastroenteritis) deals with the clinical features and management of gastroenteritis, some forms of intestinal obstruction, paralytic ileus and chronic constipation.

Chapter 57 (The Management of Anorexia) deals with five types of anorexia as a disease with their clinical features and management.

Chapter 58 (The Management of Retention of Urine) describes twelve clinical types of retention of urine (bladder neck obstruction, stricture urethra, cystourethritis, etc.) and their management. Several useful recipes, including some to dissolve urinary calculi are given.

Chapter 59 (The Management of Dysuria) deals with the clinical features and management of dysuria of eight types (including traumatic, faecal obstructive, calculus and gravel dysurias).

Bhuta-Vidya\textsuperscript{10} (Ch. 60-62) (Psychiatry)

Chapter 60 (The Management of Seizures caused by Superhuman Agencies) deals with the invasion of human beings by superhuman agencies and the treatment of seizures caused by them.

Chapter 61 (The Management of Epilepsy) deals with all aspects of epilepsy including several excellent recipes to control the same.
Chapter 62 (The Management of Psychoses) deals with the diagnosis and management of psychoses.

Tantra-Bhusana⁹ (Ch. 63-66) (Aphorisms)

Chapter 63 (Compilation of the Different Tastes) compiles the 63 combinations of 6 tastes in all possible permutations to counteract the 63 possible combinations of Doshas.

Chapter 64 (Measures to keep Healthy) deals with the daily regimen during different seasons, types of diets and suitable times for the administration of medicines in relation to meals to keep healthy.

Chapter 65 (The Maxims) deals with the 32 maxims (general principles) used in Sushruta Samhita with examples to correlate sentences and clarify the meaning of the text.

Chapter 66 (Compilation of the Different Doshas) deals with 62 (+1) combinations of the Doshas and their relation to Dhatus and Malas in health and disease.

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CONCEPT OF SWASTHAVRITTĀ (PERSONAL HYGIENE)
JYOTIR MITRA

Importance and Definition of Health

Everybody has three pursuits (eshana), i.e., pursuits of life (Pranaishana), pursuit of wealth (Dhanaishana) and pursuit of the after life (Paralokaishana).¹ In this Caraka's view, the last one is replaced by the pursuit of duty (Dharmaishana) in the compendium of Bhela.² The later vedic works, like the Satapatha Brahmana (XIV. 6.3.2.) and Brhadaranyak Upanishad (III. 5.1) have already expressed their thoughts towards it and put an importance on the pursuit belonging to progeny (Putraishana) and self-assertion (Lokaishana). Having the same ideology in the mind, the Suttanikaya (XLV. 161, 163) of Vinaya Pitaka, has also put three pursuits or longings to be observed by the Buddhist monks; these are longing for sensual delights (Kameshana), the longing for becoming or re-birth (Bhaveshana) and the longing for a holy life or celibacy (Bahmachariyeshana). If we review all the above ideas, it appears that well-being is a common factor which cannot be gained unless there is sound health. Therefore, the Dhammapada (XV. 8) proclaims health as the highest gain (Arogyam parama labha). Not so much, but it is a supreme gate of progress, says one of the Jatakas (I. 84). Atreya opines that sound health stands at the very root of virtuous acts, acquisition of wealth, gratification of health, well-being and life.³ Out of all these pursuits, priority has been given to the desire for longevity and it is the sumnum bonum for everybody. It is so important and unavoidable that with the end of life, there is an end to everything. Longevity can be achieved by observance of the rules meant for health preservation.

Sushruta gives the definition of a healthy man (Swastha). According to him, a person, whose bodily Doshas (Vata, Pitta
and *Kapha* or *Sleshman*) are in a state of equilibrium with an uniformly healthy digestion, and in whom the function of *Dhatu* (*Rasa, Rakta* etc. seven in number) and *Malas* or waste products are normal accompanied by properly functioning senses, mind and body, is said to be a healthy-person.⁴

Of the two main aims⁶ of *Ayurveda*, preservation of health is supreme. If the constituent factors of the body are in a state of equilibrium, it is called health or *Prakriti*. Otherwise, it is denoted as disease or *Vikriti*.⁶ *Caraka*, pointed out the factors responsible for keeping a person free from disease, says that ‘one who resorts to wholesome diet and regimens, who enters into action after proper observation, who is unattached to the pleasure drawn from satisfaction of sensory objects, who is given to charity, impartiality, truthfulness and forgiveness and who is at the service of learned people, seldom gets, afflicted with disease. Moreover, diseases do not befall a man in whom thought, speech and deed are happily blended, the mind is controlled and the understanding is clear and who is possessed of knowledge, austerity and the love for meditation.’⁷ An avoidance of causes of diseases as excessive utilisation (*Ati-yoga*) non-utilisation (*A-yoga*) and wrong utilisation (*Mithya-yoga*) of objects (of senses), intellectual blasphemy (*Prajnaparadha*) and time (*Kala* or *Parinama*) leads to a normal health. The above-mentioned three are the causative factors of diseases and they can be alleviated by achieving the correct knowledge, practising the wholesome contact with senses and observance of seasonal normality respectively.⁸

**Scope of Personal Hygiene**

*Bhavamishra*, a later medical author, elaborating the scope and field of personal hygiene, states that it includes the course or conducts (*Charya*) of day, night and season; if the observances are properly followed, a person can always possess a good and sound health⁹.

We shall treat the subject with the material available in *Ayurveda* and other Indian literature on the parametres of *Bhava-prakasa*, starting from an evacuation early in the morning till the night sleep including the conduct to be observed in the respective seasons.
Conducts of Day (Dina-charya)

After getting up from the bed early in the morning, one should go for evacuation to a latrine (varcah Kuti). The Cullavagga of the Vinaya Pitaka, a Buddhist work, furnishes a vivid description regarding the construction of a latrine and urinal (Passava ghara) and the observances to be followed therein. Caraka, giving the admonitions in the context of excretion of natural urges (Vega), states that one should not excrete the faeces and urine in front of the wind, fire, water, the moon and the sun and also on the road and public place\textsuperscript{10}. Vagbhata, the elder, has also mentioned some rules and conducts to be observed during the evacuation. As per his advice, one should evacuate facing the north in the day and facing the south in the night with proper and attentive silence. The Paraskara Grihya Sutra, a post-vedic work dealing with domestic and household rituals, opines that the evacuation in standing position is forbidden. Vagbhata includes cowhouse, anthill, ashes, cowdung and cultivated field as forbidden places for evacuation but this can be violated in case of fear and weakness.\textsuperscript{11} It would not be out of course, if we include here the observance advocated in Buddhist work in this regard. During that time, there was provision of having separate Sandals (paduka) for this purpose. To relieve in privy was not based on seniority but it was in order of arrival. Coughing was essential for both standing outside and sitting inside the privy. Entrance to privy was allowed after having the robe set aside on bamboo or cord and no one can enter there hastily and forcibly. Dropping of a piece of wood for scraping into a cesspool was prohibited. Smacking with lips and putting the water in the saucer was not allowed. The privy was washed in case it was dirty. Pieces of wood for scraping were thrown away outside the privy. The privy was also washed if the plaster flooring, cell and porch were soiled. Water was tipped into the vessel in case of shortage of water for rinsing\textsuperscript{12}

The monks had to evacuate at one side in a monastery. A balustrade was made in order to avoid the piling of bricks, stones and wood in the cesspool. Privy shoes avoided the painful sitting. There was wood and a receptacle. The cesspool,
being uncovered, became nasty-smelling, therefore a lid was kept on it. There was provision for a hut for the privy in order to avoid the botheration caused by cold and heat in open air evacuation. A door was fixed to the hut and sword-fish, the five pieces of cloth, a bamboo for robes and a cord provided for that purpose. The chairs with supporters were also allowed to certain monks, weak through age who might fall down while they evacuated. The hut was fenced by bricks, stones and wood. There was a door to the parch. A cell became swampy, therefore, there was a drain for water. A vessel was also kept for water for rinsing. A saucer was also necessary. Special shoes were worn for rinsing to avoid the painful sitting. The vessel for the water for rinsing was covered with a lid.\textsuperscript{13}

The monks had also to make water at one side in a monastery. The vessels were also allowed in order to avoid the nasty smelling. Urinal shoes (\textit{Passava Paduka}) were also there for avoiding the painful sitting. The same were also fenced by the same material as mentioned with regard to the latrine. Vessels were kept with lids on.\textsuperscript{14}

Both the parts were cleaned with soft soil and washed with water.\textsuperscript{15}

\textbf{Brushing of Teeth}

The terms \textit{Danta-pavana}, as per \textit{Caraka},\textsuperscript{16} \textit{Sushruta}\textsuperscript{17} and \textit{Vagbhata}\textsuperscript{18} the younger, and \textit{danta-dhavana}, as per \textit{Vagbhata} the elder, are meant for tooth-brush in \textit{Ayurveda}. According to \textit{Charaka}\textsuperscript{19} twigs called from the \textit{Karanja} (Pongamia glabra Vent.), \textit{Karavira} (Nerium indicum Mill), \textit{Arka} (Calotropis procera (Ait.), \textit{Malati} (Jasminum grandiflorum Linn.), \textit{Arjuna} (Terminalia arjuna W. and A.), \textit{Asana} (Pterocarpus marsupium Roxb.) and other trees are recommended for use in tooth-cleaning.\textsuperscript{20} \textit{Sushruta}\textsuperscript{21} gives the choice on the basis of taste, therefore, he suggests \textit{Nimba} (Azadirachta indica A) in bitter taste, \textit{Babbula} (\textit{Acacia arabica} Willd.) or \textit{Khadira} (\textit{Acacia catechu} Willd.) in astrigent (\textit{Kashaya rasa}) taste, Madhuka (\textit{Madhuca indica} J.F. Gmel.) in sweet taste and lastly \textit{Karanja} (\textit{Pongamia pinnata} Linn.) in pungent taste. (\textit{Vagbhata}, the elder,\textsuperscript{22} adds \textit{Sarja} (\textit{Vateria indica} Linn.), \textit{Apamarga} (\textit{Achyran-
thes aspera Linn.) and Arimeda (Acacia Leucophloea Willd.) to Caraka’s list.

According to Buddhists, the tooth-wood should be eight finger breadths (in length) at the most; if too short it might become lodged in one’s throat, therefore, a piece of wood-tooth (Danta-kastha) should have four finger breadths in length at the very least. Medical works differ on this point. Sushruta says that the tooth-wood should be straight, not worm-eaten, devoid of any knot or at most with one knot only and should be twelve fingers in length and like the smallest finger in girth. Both the Vagbhatas share this view too.

The main action of tooth-brushing is to remove the bad smell of the mouth and for cleansing the teeth. The five advantages of chewing the tooth-wood are indicated in the Cullavagga and they are as follows: (i) it is good for the eyes, (ii) it spills out the nasty smell of mouth, (iii) the channels of taste are purified, (iv) Bile and mucous do not get on to the food and (v) one’s food is enjoyed.

Caraka advises tooth-brushing twice a day and states that tooth-cleansing dispels oral fetor and dysgeusia, removes the impurities of the tongue, teeth and mouth and promptly induces the appetite. Sushruta, describing similar advantages, adds that it also produces a good relish for food and a cheerfulness of mind.

Tongue-scrappers, made of either gold, silver or copper or tin or brass, should be applied and the same should not be sharp-edged and curved. It is seen that deposited dirt at the root of tongue obstructs expiration and gives rise to foul smell therefore this is quite essential.

**Oral hygiene: Chewing and gargles**

Caraka, for clarity, taste and good smell of mouth, indicates several fruits like Puga (Areca cotechu Linn.), Sukshmaila (Elettaria cardemomum Maton.), Jati (Myristica fragrans Houtt) and others, and fresh leaf of Tambula (piper betel Linn.) and the extract of camphor. Oil-gargling and water-gargling are also advised. Oil gargling is beneficial for the strength of jaws, depth of voice, flabbiness of face, excellent gustatory sensation and good taste for food.
Water-gargling dispels the phlegm, quenches thirst and removes the dirt of buccal cavity.

Cutting of hair and nails

Pointing out the virtues of dressing the hair, Caraka\textsuperscript{32} says that trimming and dressing of the hair, beard and nails etc. promotes plumpness, virility and longevity including cleanliness and beauty. He\textsuperscript{33} and Vagbhata,\textsuperscript{34} suggest that the same should be done thrice a fortnight.

Anointment

Oilng of head and ears is very beneficial and if oil is applied on the head regularly, it prevents headache, baldness, greying of hair and produces sound sleep and happiness. Vitiating Vata, torticollis, lockjaw, hardness of hearing and deafness are prevented if oil is dropped into ears regularly.\textsuperscript{35}

Sushruta says that oil-massage of the body imparts a glossy softness to the skin, guards against the aggravation of the Vayu and Kapha, improves the colour and strength and, gives a tone to the tissues of the body\textsuperscript{36}—Caraka adds the tolerance to hardship and induction of physical strength to the above.\textsuperscript{37} He, further, reveals that regular oil massage slackens the onslaught of aging.\textsuperscript{38} Moreover, unction, over the body, eliminates bad smell, cures heaviness, drowsiness, itching and removes undesirable dirt and unpleasantness due to sweating.\textsuperscript{39}

Smoking

Smoking of cigars made of many useful drugs is also advocated in Ayurveda. Unctuous (Snaihika), habitual (Prayogika) and Dosha-eliminator (Virechaka) are the varieties of the cigars mentioned for their respective purposes.

Smoking (Dhuma-pana), if done properly, cures heaviness of the head, headache, rhinitis, hemicrenia, earache, pain in the eye, cough, hic-cough, dyspnoea, obstruction in throat, weakness of teeth, discharge from the morbid ear, nose and eye, purulent, smell from nose and mouth, toothache, anorexia, lock jaw, torticillus, pruritus, infective conditions, paleness
of face, excessive salivation, impaired voice, tonsilitis, uvulitis, alopecia, greying of hair, falling of hair, sneezing, excessive drowsiness, loss of consciousness and hypersomnia. It also strengthens hair, skull-bones, sense organs and voice. Habitual smoking should be done eight times and they are after bathing, eating, tongue-scraping, sneezing, brushing the teeth, inhalation of medicated material, application of collyrium and after sleep. Signs like lightness, of the chest, throat, head and liquification of Kapha are the features of correct smoking.

Excercise

Physical exercise (Vayayama) is quite essential for a person to maintain his normal health. Caraka, giving the definition, says that such physical action which is desirable and is capable of bringing about bodily stability and strength is known as physical exercise. According to Sushruta, the action which exerts the body is called Vayayama. Physical exercise brings about lightness, ability to work, stability, resistance to discomfort and alleviation of Doshas (specially Kapha). It stimulates the power of digestion. Sushruta adds growth into body, embellishment, compactness to above. There is no other measure to reduce the obesity in comparison to it. A person, practising daily exercise, does not suffer at all and his face becomes attractive and lovely. Perspiration, enhanced respiration, lightness of the body, inhibition of the heart and such other organs of the body are indicative of the exercise being performed correctly.

Fragrant unguent

When the body is rubbed with perfume paste (Udvartana), it pacifies the Vata, liquifies the Kapha and fat, tones up the body, brings about the lusture, enhances the circulation and promotes the heat inside the body.

Bathing

After rubbing the body with fragrant unguent, one should take a bath. In ancient India, people used to take their bath
either in the pond or the river. We can corroborate it by giving the archaeological evidence regarding the existence of a great bath at *Mohenjo-daro* (c. 3500 B.C.) under Indus Valley civilisation.

The Buddhist works mention the construction of bathroom in detail. According to them, the bathrooms were made at a higher level from the ground, so that it was not flooded by water during rains. It needed a door, a door-post and lintel, a post for the bolt, a key hole, a hole and a cord for pulling it through. The fire place was made at one side of a small bathroom. Spreading of bricks, stones and wood was allowed. The drain was connected with the bathroom.  

Our Ayurvedic compendia lack the above mentioned material. *Charaka*, pointing out the merits of bathing, states that having a bath is purifying, promotes virility and longevity, allays fatigue, sweat and dirt, is conducive to bodily strength and is vitalizing in the highest degree. *Sushruta* observes some specific merits in bathing. He views that bathing removes somnolence and bodily heat. It allays thirst and checks itching and perspiration, brings on a fresh relish for food, removes all bodily impurities, clears the sense organs, gladdens the mind, purifies the blood and increases semen. He also describes separately the merits of bathing in cold and hot water. He also advises against bathing in some cases.

*Sushruta* is the only authority who throws light on the merits of scrubbing (*Udgarshana*). He says that scrubbing or friction pacifies the bodily *Vayu*, cures itches, rashes and eruptions (*Kotha*). Mentioning the special scrubber named *Phenaka*, he says that it imparts lightness and steadiness to the thighs, cures itches, eruptions, *Vatastambha* and excretal diseases. Friction of the body with brickbat powders excites the heat of the skin, brings on the dilatation of the orifices of the bodily ducts and cures itches.

**Wearing of clean clothes and use of fragrance**

After a bath, one should dress in clean clothes which add to the bodily charm, reputation, longevity and prevents inauspiciousness or bad omens. It brings about pleasure, grace, competence to participate in conference and good looks.
Use of scents and garlands stimulates libido, produces an agreeable fragrance in the body, enhances longevity and charm and gives corpulence and strength to the body; it is pleasing to the mind and it prevents ill omens.\textsuperscript{68}

_Sushruta_, explaining the anointing (Anulepana) says that anointing the body with a scented paste removes a sense of fatigue and perspiration. It produces a sense of pleasure and improves the strength and complexion of the body; enhances the beauty and glow of the frame and gives it a lovely appearance.\textsuperscript{67} Wearing of jewels and ornaments adds to the prosperity, longevity and grace and prevents danger from poison and evil spirits. It is also conducive to _Ojas_.\textsuperscript{68}

**Application of collyrium**

Both _Charaka_ and _Sushruta_, have advocated the use of _Anjana_, the antimony collyrium (Sauviranjana), which is beneficial to the eyes and should be used daily and the Indian berybery (_Rsanjana_) once every fifth or eighth night.\textsuperscript{69} According to _Sushruta_, _Sroto'njana_ is the best collyrium amongst all and it alleviates the burning and itching sensation in the eyes, removes all local pains, secretion and impurities, increases the range of vision, enables the eyes to bear the blasts of the wind and glare of the sun and guards against inroads of ocular affection.\textsuperscript{60}

**Food**

Among the supporters of life (Upastambha), the food is supreme.\textsuperscript{61} Food is the chief source of bodily strength and complexion. It is the source of growth, strength and healthful glow of organic beings. It is food that imparts strength to the organs of sense and makes them operative in their respective fields of action.\textsuperscript{61}

Food-intake is compared with a sacrifice (_Yajna_) in _Ayurveda_ as it is performed in the evening and the morning. Similarly, it is said, one should take food at both the times.\textsuperscript{63} _Charaka_ has thrown more light on dietetics. Under the _Ahara-vidhi-viseshayatan_, he advises one to follow the eight essential factors and they are nature of the food articles (_Prakriti_), method of
processing (Karana), combination (Samyoga), quantity (Rasi), habitat (Desa), stage of the individual (Kala), rules governing the intake of food (Upayoga-samstha) and rules of use and user (Upayoktr).  

The food should be fresh, warm, unctuous, in proper quantity and delicious. One should take food in a proper place equipped with all the accessories. It should not be taken too hurriedly or very slowly. One should not talk or laugh or be unmindful while taking food and the same should be taken in a prescribed manner.  

One should not take food without wearing precious stones in hand, or without taking bath, or with torn apparel, or without reciting Mantras or, without offering oblations to the Gods or, without making offering to the departed ancestors, teachers, guests and dependents or, without applying sacred scents or without garlands or without washing hands, feet, face or without cleaning the mouth or with face turned towards the north or with disturbed mind or surrounded by the insincere, uncultured, dirty or hungry persons or in uncleaned dishes, or at improper place and time or in a place surrounded by many persons or without first offering the fire or without sprinkling with sacred water or without sanctifying it with sacred Mantras or with contemptuous disposition towards food. One should not take food which is dirty or which has been served by the opponents.  

Except in the case of meat, rhizomes, dry vegetables, fruits and sweets, one should not take stale food. Again, one should not consume the entire food except in the cases of curds, honey, salt and roasted grain flour and ghee. One should not take curds at night. One should not take roasted grain flour without mixing it up with ghee and sugar or in the night or after meals or in large quantities or twice daily or interrupted with water intake, nor should one eat by tearing with one’s teeth.  

Bhavamisra, prescribing the order of taste, opines that after having ginger with salt as appetiser, one should, first of all, take the sweet taste, thereafter sour and salt tastes and lastly pungent, bitter and astringent tastes.  

Food is said to be of six types: (i) suckable (Chushya) as sugarcane, (ii) drinkable or beverage (Peya) as syrup etc.,
(iii) lickable (lehyā) as honey, (iv) soft food (Bhojya) as rice, (v) hard food (Bhakshya) and (vi) chewable (Charvya) as gram etc.68

To increase the appetite, one should take a very small quantity of water during the meal. After having the meal, one should walk for a while before going to bed.

Conduct during twilight

One should worship God both during twilight and at dawn; during this period an intake of food, sexual intercourse, sleep, learning and walking are forbidden69.

Conducts of night (Ratri-chārya)

Under the Rātri-chārya (observances or conduct to be followed during the night), the bed should be very soft and comfortable and equipped with a mosquito-net (masaka kuti).70 After lying down on the bed, shampooping should be carried on.

Sexual intercourse

Every person possesses daily the natural urges of hunger, thirst, sleep and desire for sexual intercourse.71 Every healthy man possesses the desire for sexual intercourse and if it is not practised, obesity may occur along with diabetes accompanied with physical slackness, proclaims, Bhavamishra.72 Sushruta lays down the rules regarding the interval period for the same. One may co-habit with one's wife on each fortnight in all the seasons of the year except in summer when he may see her once a fortnight.73 One can enjoy oneself at night during winter, in the day during summer, in the day and night both during spring and at the time of the thundering of the clouds during the rainy season.74

One should not co-habit with a woman having menstrual period, devoid of passion, dirty-clad, older than one, suffering from diseases, pregnant, the wife of a teacher and nuns.75

Both the partners, after gratifying each other during the sexual act, should take milk and other sweet articles in order to allay the fatigue and restore the health. Meat-juice is also very useful.76
Night sleep brings about an equilibrium in Dhatus, dispels lassitude and promotes vigour, enthusiasm and hunger.\textsuperscript{77}

Conducts of seasons (Ritu-charya)

In India, the year is divided into six seasons (ritus). The northward movement of the sun and its act of dehydration bring about three seasons beginning from the late winter (Shishira) to summer (Grishma). The southward movement of sun and its act of hydration give rise to the other three seasons beginning with the rainy (Varsha) to early winter (Hemanta).\textsuperscript{78}

Twofold classification of seasons

Keeping in view the predominance of taste and strength, the first classification of season is as follows:

<table>
<thead>
<tr>
<th>Ayana</th>
<th>Ritu</th>
<th>Months as per Hindu Calendar</th>
<th>Months as per English Calendar</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Solstice)</td>
<td>(season)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uttarayana:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(adana kala) or period of dehydration</td>
<td>1. Shishira (late winter)</td>
<td>1. Magha and Phalguni (Jan.-Feb.)</td>
<td>2. Phalguni (Feb.-March)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Vasanta (Spring)</td>
<td>1. Chaitra March-April</td>
<td>2. Vaishaka April-May</td>
</tr>
<tr>
<td>Daksinayana: (Visarga kala or the period of hydration)</td>
<td>1. Varsha (rainy season)</td>
<td>1. Shravana July-August</td>
<td>2. Bhadrapada August-Sept.</td>
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</tbody>
</table>

In the period of Visarga (emission), the winds are not very dry as they are during the period of Adana (dehydration). The period of emission predominantly shares the qualities of the moon and during this period, the moon, with the unstrained.
cooling property, continuously delights the world with its soothing rays; the period of dehydration, on the other hand, is dominated by the qualities of Agni (fire), so these two the sun and the wind—and the moon being governed by the time, and nature and the path they follow, constitute the causes of time, season, taste (in drugs and diets), vitiation of Doshas and bodily strength.  

During the period of dehydration, not only the sun with its rays, but also winds with their sharp velocity and dryness, absorb the moisture from the earth. Winds progressively bring about dryness in the atmosphere during the three seasons of this period, viz., late winter, spring and summer, which enhance the bitter, astringent and pungent tastes respectively—all having drying effects and as a result, human beings also become weak.

During the rainy season, autumn and winter, the sun moves towards the south, and its power (of heating) is slackened by various factors, viz., the time, course, storm and rain but the moon is not affected. The earth is relieved of its heat by the rain waters and (drugs having) sour, salty and sweet tastes which cause unctuousness in the body grow during the rainy season, autumn and winter respectively. As a result of these, human beings also progressively grow in strength during the period of Visarga or elimination.

Another classification of season

Here is another classification of seasons as per elimination of the provoked doshas:

<table>
<thead>
<tr>
<th>Division of day and night</th>
<th>Seasons</th>
<th>Months as per Hindu Calendar</th>
<th>Months as per English Calendar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pratyushas (early morning)</td>
<td>3. Hemanta (early winter)</td>
<td>1. Pausa</td>
<td>Oct.-Nov.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dec.-Jan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Jan.-Feb.</td>
</tr>
</tbody>
</table>
(morning) (Spring) 2. Chaitra March-April
Madhyanha 5. Grishma 1. Vaisakha April-May
(noon) (summer) 2. Jyestha May-June
Aparahna 6. Pravrit 1. Ashadha June-July
(afternoon) (early) 2. Shravana July-August
  (rainy)

The three doshas have to go in three stages, i.e., Pitta is accumulated in Varsha (rainy season), is provoked in Sharad (autumn) and is automatically pacified in Hemanta (early winter), Kapha is accumulated in Hemanta (early winter), is provoked in vasanta (Spring) and is automatically pacified in Grishma (summer). Vata is accumulated in Grishma (summer), is provoked in pravrit (early rainy season) and is automatically pacified in Sharad (autumn) season. Doshas are eliminated during their provoked or vitiated stages, i.e., Pitta is eliminated by purgative in Sharad (autumn); Kapha is eliminated by vomiting in vasanta (spring) and the Vata is eliminated by enemeta (Basti) in Pravrit (early rainy season) and this vitiated stage of particular Dosha produces particular diseases pertaining to it. Thus, this preventive measure, if properly followed, does not allow the Doshas to produce the diseases.

Dietatics and regimen for winter

During the cold winter (Hemanta), the digestive power of human beings possessing good health is enhanced due to restraint caused upon it by the cold wind, so much so that it is capable of digesting any food irrespective of its heaviness and quantity. When it does not get the proper fuel, the digestive fire affects the nutritive fluids, resulting in the vitiation of Vata having cold quality. Therefore, during the winter, one should take the unctuous, tart and salty juices of the meat, of the aquatic and marshy animals which are fatty. One should also eat the meat of burrow-dwelling animals and Bhrita (a preparation of meat by mincing it) prepared of animals Prasaha type (who eat by snatching). Thereafter, one should drink Madira and Sidhu types of wine and honey.

If one habitually takes preparations of cow’s milk, cane-
juice, fat, oil, new rice and hot water during the winter, one's span of life is never decreased.

In winter, one should resort to massage, unction, application of oil on the head, fomentation by Jentaka process, and one should reside in an underground residence and the inner heated apartment of a building. In this season, one should see that the conveyance, bedding and seat are well covered specially by heavy wrappers, skin, silken, cloth, ropes and blankets. One should wear heavy and warm clothes and should besmear the body with heavy Aguru (Aquilaria agallocha Linn.). One should embrace a healthy woman with her well developed and full breasts, and with her body besmeared with Aguru; then he should lie down on the bed intoxicated with strong passion. One may indulge in excessive sexual intercourse during this season. One should avoid food and drink which are light and are liable to vitiate Vata. One should not expose himself to cold wave. Underfeeding and intake of gruel are also to be avoided.84

Dietetics and regimen for late winter

The winter (Hemanta) and late winter (Shishira) seasons are almost similar in nature with the only difference that in the latter, dryness caused by Adana (absorption) and cold caused by the cloud, wind and rains prevail. So the entire prescription for Hemanta is to be followed in the Shishira as well. One should stay in a windless and warm home: more so during the Shishira. One should avoid taking such of the diets and drinks as are possessed of pungent, bitter and astringent tastes which are instrumental in vitiating the vata and are light. During Shishira, one should avoid taking the cold diets and drinks.83

Dietetics and regimen for spring

During the spring (Vasanta), the accumulated Kapha is liquified by the heat of the sun and as such disturbs the power of digestion and causes many diseases. So, one should administer therapies like emesis (Vamana), etc., and should avoid heavy, unctuous, sour and sweet diets. One should not also sleep during day time. At the advent of spring one should
habitually resort to exercise, unction, smoking, gargling and collyrium. The excretory orifices should be regularly washed with lukewarm water. One should besmear one’s body with sandal and Aguru and take food consisting of barley and wheat, meat of Sarabha (wapiti), Shasha (rabbit), Ena (antelope), Lava (common quail) and Kapinjala (grey partridge). One should drink unpolluted Sidhu and Mridvika types of wine. One should also enjoy the blossom of a woman and the garden.\textsuperscript{86}

Dietetics and regimen for summer

During the summer (Grishma), the sun evaporates the moisture of the earth by its rays. In that season, the intake of sweet, cold, liquid andunctuous diets and drinks is prescribed. One who takes cold Mantha (a type of groat) along with sugar as well as the meat of the animals or birds of arid climate, ghee and milk along with Shali rice (oryza sativum Linn.), during this season, does not suffer from any disease. One should either drink alcohol in little quantity or should not drink at all and even if one drinks, he should drink along with plenty of water. One should further avoid taking diets which are salty, sour, pungent or hot. Physical exercise must also to be given up during this season. During the night, after having besmeared the body with sandal paste, one should sleep on the open airy roof of the house which is cooled by rays of the moon. One decorated with pearls should be comfortably seated on a chair enjoying fans and the touch of tender hands: both cooled with sandal water. One should keep himself aloof from sexual intercourse and should enjoy gardens, cold water and flowers during this season.\textsuperscript{87}

Dietetics and regimen for the rainy season

In the body, weakened during the period of dehydration the power of digestion is also weakened. It is further weakened due to vitiation of Vata and other Doshas during the rains (Varsha). The power of digestion in the period is also affected due to gas coming out of the earth, rainfall, increase of acidity in water and consequently Vata and other Doshas get vitiated.
So it is advisable to be moderate as regard to diet and regimen during this season. One should abstain from taking Mantha (groat) diluted in excess, day sleep, frosts, water from river, excessive exercise, moving in sun, and indulgence in sexual intercourse. One should generally use honey in preparing diets, drinks and others. If the days are cooler due to heavy rains accompanied by storms, one should take such of the diets as are conspicuously sour, salty and unctuous, this serves as an effective antidote to the vitiation of Vata during the season.⁸⁹

In order to maintain normal power of digestion one should take old barley, wheat and Shali rice along with the meat of arid animals and vegetable soup. Moreover, one should drink the Madhvika or Arishta type of liquor, pure rain water or water from the well or pond : boiled and cooled and mixed with a little honey. It is advisable to rub the body, apply unction, take a bath and wear fragrant garlands. One should wear light and clean apparel and should reside in a house devoid of humidity.⁹⁰

**Dietetics and regimen for autumn**

The body parts adopted for rains and cold are suddenly exposed to the heat of the sun with the beginning of autumn (Sharad) so the Pitta accumulated during the rains gets generally vitiated. In this season, sweet, light, cold and bitter foods and drinks which have potentialities to alleviate pitta are to be taken in proper quantity when there is good appetite. Furthermore, the meats of Lava (common quail), Kapinjala (grey partridge), Ena (antelope), Urabhra (sheep), Sarbha (Wapiti) and Sasa (rabbit), rice, barley and wheat and prescribed in this season. Intake of ghee prepared with bitter medicines, purgation, blood-letting are also prescribed. One should avoid taking sun bath, fat, oil and meat of aquatic and marshy animals and alkaline salt preparations and curds. One should not sleep during day time and should not expose himself to frost and easterly wind. The water is exposed to the heat of the sun during the day time and to the cooling rays of the moon during night, it is also purified by time and is detoxicated by star canopus (Agastya) this is known as ‘Hamsodaka’ which
CONCEPT OF SWASTHAVRITTA (PERSONAL HYGIENE)

is spotlessly clear and is as beneficial as nectar for the purpose of bathing, drinking and swimming. Use of garlands made of autumnal flowers and clean apparel and also the rays of the moon in the evening are exceedingly beneficial in this season.  

Conclusion

The material of personal hygiene (Swasthavritta) was succinctly presented here and our Indian culture had been enhancing it from time to time as per advancement of ideas and thinking. Puranic literature possesses enormous material and its nucleus can be found in the Hindu Dharma-Shastras.

Besides, Ayurveda also gives an emphasis on moral conducts or ethics (Sadvritta) which are instruments in throwing the impurities of mind. Sensory organs (Indriyas) are governed by the mind (Manas) and thus the personal hygiene paves the path for psycho-somatic study. If the regimens are followed properly, person can attain happy and prosperous life.

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ABBREVIATIONS

A.H. = Astanga Hrdaya
A.S. = Astanga Sangraha.
B.S. = Bhela Samhita.
C.S. = Charaka Samhita.
Cull = Cullavagga.
S.S. = Susruta Samhita
Sar. = Sarira Sthana
Sut. = Sutra Sthana
V.P. = Vinaya Pitaka
9 PRINCIPLES OF TREATMENT
C.P. SHUKLA

Definition of Chikitsa

Chikitsa means the treatment of a disease. The word Chikitsa is derived from the verb 'kit' which means Rogapana-payana i.e. cure or relief from disease. It also means removal of disease.

Synonyms of Chikitsa

There are many synonyms of Chikitsa. They are

(1) Chikitsam  (2) Vyadhiharam  (3) Pathyam
(4) Sandhanam  (5) Aushadham  (6) Prayaschittam
(7) Prashamanam  (8) Prakriti Sthapanam and (9) Hitam.

Explanation and application of the above terms

(1) Chikitsam —Same as Chikitsa
(2) Vyadhiharam —Removal of disease
(3) Pathyam —Do's and dont's or wholesome and suitable diet and other regimen to be observed in disease and health.
(4) Sadhanam —Other methods of treatment without the use of medicines.
(5) Aushadham —Medicines used for treatment i.e. medical treatment.
(6) Prayaschittam —Psychic or mental treatment. This is to bring confidence in the mind.
(7) Prashamanam —Treatment for subsiding disease and symptoms i.e. symptomatic treatment.
(8) Prakruti-Sthapanam
—To bring the patient to his normal constitution.

(9) Hitam
—Suitability; use of wholesome diet and other regimen in health and disease.

It is clear from the above, that the word Chikitsa covers up a vast field. It not only means relief from disease but also to bring the patient to his normal individual constitution. It includes relief from stress and strain. It does not include only medicines but also other things like diet, daily routine, atmosphere and mental health.

Definition of Kayachikitsa

The term Chikitsa is usually joined with the term kaya. That is to say the term Kaya-Chikitsa is usually used in Ayurveda. It is necessary here to understand the term Kaya which means Body.

There are 3 words used for body viz. Deha, Sharira and Kaya. All these words carry a specific meaning. The term Deha is derived from the verb Dih which means that which is nourished. Thus the term Deha carries the sense of anabolism. The term Sharira is derived from the verb Shru meaning that which undergoes degeneration and decay. Thus the word Sharira carries the sense of Katabolism.

The term Kaya is derived from the verb Chi which means selection of suitable nutrition i.e. to absorb useful substances and eliminate the non-useful ones. This carries the sense of both anabolism and Katabolism i.e. metabolism. The process of metabolism takes place with the help of digestive juices, enzymes and hormones and so some commentators are tempted to explain Kaya as Agni or digestive fire i.e. enzymes.

From the above, it will be clear that the term Kayachikitsa means the treatment of the whole body and also of Agni i.e. of digestion and metabolism.

Samprapti Ghatakas and Pathogenesis

Every disease, whether acute or chronic, mild or severe passes through certain stages. These stages are called Kriya-
kala, or the time for treatment. They are six in number viz. (1) Sanchaya or accumulation of morbid Dosha. (2) Prakopa or vitiation of Dosha, (3) Prasara or spread of Dosha, (4) Sthana-sanshraya or localization (5) Vyakti or manifestation of disease and (6) Bheda or chronicity, complications etc. At any of the above stages and specially at the stage of Sthana-sanshraya i.e. localization, the vitiated Doshas combine with Dushya i.e. body tissues and vitiate them. This is called Dosha-Dushya Sammurchhana. The spread of the Doshas and Dhatus takes place through Srotas i.e. Blood vessels, lymph vessels and cellular spaces etc. At some level, i.e. in the beginning or during the process of Pathogenesis, the Agni or digestion and metabolism gets impaired, which results in indigestion, impaired metabolism or impaired assimilation and a new unwanted product is produced. This is called Ama in Ayurveda. Ama may be produced at any level of digestion or intermediary metabolism or at the end, when body tissues are formed. Thus there are five factors of Pathogenesis viz. (1) Vitiated Dosha, (2) Dushya and the combination of Dosha with Dushya i.e. Dosha-Dushya-Sammurchhana, (3) Srotas or body channels, through which nutrient material and waste matter or metabolic by products flow, (4) Agni i.e. digestive juices, and/or hormones and enzymes, and (5) Ama or impaired and unwanted products of digestion and metabolism.

It is worth quoting here that Vyadhi-Ksamatwa i.e. immunity or resistance is considered as a most important factor for production or prevention of disease and/or reducing the severity of disease. Thus, the aim of Ayurveda is to promote health (Swasthasya swasthya Raksana), increase immunity and resistance (Vyadhi Kshamatwa) and to cure a disease (Vyadhi parimoksha).

The importance of the knowledge of the Pathogenic process is to break or check the spread of vitiated Dosas from the beginning i.e. from the stage of Sancaya etc., or before the disease manifests itself, and when the disease is established, to cure or obtain relief from the disease before it becomes chronic or complications start. If the disease becomes chronic then for limitation of disability or for rehabilitation. This can be explained as under:
## Principles of Treatment

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<td><strong>Interaction of Host and environment</strong></td>
<td><strong>Sanchaya</strong> or <strong>Prakopa</strong> and <strong>Prasara</strong>&lt;br&gt;<strong>(Pre-pathogenesis)</strong>&lt;br&gt;i.e. (early pathogenesis)**&lt;br&gt;Promotion of health. Specific protection</td>
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<td><strong>Stanasanshrya</strong> or demonstrable early disease**</td>
<td><strong>Vyakti</strong></td>
<td><strong>Bhedha</strong> i.e. <strong>Bhedha</strong>&lt;br&gt;chronicity</td>
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<td>advanced manifest disease.</td>
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<th>Early diagnosis and prompt treatment</th>
<th>Specific treatment Limitation of disability &amp; rehabilitation and rejuvenation</th>
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Thus, in short, the aim and object of treatment are

(1) *Swasthasya swasthya Rakshanam* = (1) Promotion of health<br>(2) Prevention of disease<br>(3) Rejuvenation

(2) *Aturasya vyadhi parimokshah* = (1) To cure or relieve from disease<br>(2) Rehabilitation<br>(3) Rejuvenation.

### The factors to be examined before starting treatment

The following factors should be examined before starting treatment.

(1) **Study of the individual**:  

It is necessary to understand here that no two individuals are equal in all respects. For theoretical purposes, the norms of man can be described as a range of values to be accepted as a standard, found to be the average in persons who generally appear healthy and free from disability or disease. But for practical purposes, the study of the individual will be necessary to bring accuracy in diagnosis, treatment and assessment of results. Sushruta, while describing the norm of the individual, states that "it is not possible to standardize
exact measures of *Dosha*, *Dhatu* (body-tissues) and *Mala* (waste matter) due to their varying nature (*Asthyitwat*) as well as individual variation (*vailakashanyat*) of the body constitution. Further Sushruta says, “If a physician wants to know the state of equilibrium (*Samatwam*) of all these, he can do it only by finding the signs of perfect health in that individual. The expert physician makes diagnosis or infers indirectly (*Anumanen*), the imbalanced condition of these body elements by *finding the person not in perfect mood* (*Aprasannedriyam*).”

Even the word disease means absence of ease; this cannot be established by laboratory methods or by any other clinical signs. Actually it is at this stage that pathology begins. It is the duty of the physician to recognize this stage and start treatment.

(2) Before starting treatment, it is necessary to study the individual as a whole. It is also necessary to study other factors which affect an individual. They are *Dushya* (vitiating body tissues), *Desha* (habitat), *Bala* (strength, vitality or resistance), *Kala* (season), *Anal* (digestion), *Prakriti* (individual constitution), *Vayvas* (age), *Satwa* (psychology), *Satmya* (wholesome or suitable diet etc.) *Ahara* (food or nutrition). All these should be examined before starting treatment.

There are two words used in literature (1) *Rogi pariksha* (examination of patient) and (2) *Rogapuriksha* (examination of disease).

**Rogi-Pariksa (examination of patient)**

*Rogi-pariksa* is carried out for the sake of the knowledge of his life span (*Ayushah-pramana*), (2) Strength, (*Bala*) and (3) intensity of morbidity (*Dosha-pramana*) (Charaka Viman—8-94).

**Assessment of Bala and Dosha** : The following 10 points are to be examined for assessment of *Bala* (strength) and *Dosha* (Morbidity) of the patient viz., *Prakriti* (constitution), *Vikruti* (pathological condition), *Sara* (perfectness of body tissues), *Sanhanana* (compactness), *Pramana* (proportion of the limbs and elements), *Satmya* (homologation or suitability), *Satwa* (psychology), *Ahara-Sakti* (capacity for food and its digestion), *Vyayama-Sakti* (capacity of work and exercise), and *Vaya* (age of the patient).
The examination of the above 10 factors reveals the strength and morbidity. They are classified into 3 divisions—Pravara (high), Madhya (medium), and Avara (low).

This knowledge of constitutional factors has a significance in etiology in clinical courses, in the prognosis of a disease and also in practical therapeutics.

Roga-Pariksha (examination of disease)

Roga-pariksha is necessary for the diagnosis of the disease. There are 5 methods (1) Nidana (etiological factors), (2) Poorva-Roopa (Prodromal symptoms), (3) Roopa (Signs and symptoms), (4) Upashaya (Homologous), and (5) Samprapti (Pathogenesis).

Nidana, Poorva-roopa and Roopa are known to you. Pathogenesis has been discussed earlier. Upashaya requires some clarification.

There are certain diseases, where the diagnosis becomes difficult or may not even be possible. In such cases, certain therapeutic tests are done. This is called Upashaya. The definition of Upashaya according to Charaka is ‘The use of medicines, diet and regimen which are antagonistic directly or in effect to the causative factor, disease or to both.’

In short, the proforma for the examination of the patient should consist of (1) Prakopana Nidana (exciting factors), (2) Yoni (etiological factors), (3) Utthanam (onset), (4) Adhisthana (location), (5) Sansthana (signs and symptoms), (6) Vedana (pain), (7) Shabda (sound), (8) Sparsha (touch), (9) Roopa (colour), (10) Rasa (taste), (11) Gandha (odour), (12) Upadrava (complication), (13) Vriddhi (stage of aggravation), (14) Sthana (steady continuance), (15) Kshaya (abatement), (16) Udaraka (sequele), (17) Nama (name of disease i.e. diagnosis), (18) Yoga (medicines) and (19) Pratikara-pravritti and Nivritti (do’s and don’ts).

The diagnosis of a disease is done on these methods but the acharyas have laid a very great emphasis on Tridosha in practical life. They are useful for both expert and the average physician. In this respect Charaka, in Sootrasthana 18-verse 42-44 says “When classified according to cause, pain, colour,
site, form, and nomenclature, the number of diseases become really countless. A physician need not be ashamed if he is not able to name a disease, as there can be no definite standardization of nomenclature of all the diseases. The same provoked Dosha produces various diseases according to diversity of causes and its localization. Therefore, treatment should be initiated after diagnosing the nature of the disease, different regions of localization and the special causative factors."

The assessment of the effect of treatment

The term used for the result of treatment, according to Caraka is 'Karya-phalam'. This is judged by freedom from disease. For assessment of the effect of treatment, the following four points must be examined from the beginning to the end. These four are called Chatus-shreyas i.e. four fold achievements of Ayurveda by Charaka.

It may be pointed out here that the four-fold achievements, according to the Hindu religion are Dharma (religion), Artha (money or achievement), Kama (desire) and Moksha (salvation). While according to Ayurveda the examination or observation of the following four are called four-fold achievements. Charaka says "the wise physician should carefully investigate even the minutest changes in the excess (Vriddhi), normalcy (Sthana), or mental state (Chitta)." Further Charaka says, "the circumspect physician, constantly observing the variations in the stages of diseases, gets four-fold achievements."

The above points have been explained by Charaka in Vimana Sthana by giving positive and practical observations. The signs and symptoms of cure from a disease are

1. *Rug-upashamana* (relief from pain and disease).
3. *Sharira upachaya* (increase in body-weight).
4. *Bala-vriddhi* (regaining or increase of vitality and strength).
5. *Abhyavaharya Abhil asha* (Desire for food).
(8) *Nidra-Labhah Yathakalam* (sleep at proper time).
(9) *Vaikarikanam swapnanam Adarshanam* not seeing frightful dreams.
(10) *Sukhena pratibadhanam* (happy awakening).
(12) *Sarvakaraihi Mano-Buddhi-indriyanam Avyañatti* (freedom from impairment of any kind of the mind, intellect and sense organs).

These are, in short, the criteria for cure, which consist not only in relief from pain or disease, but also ensure proper functioning of the body, body-organs, increase in vitality, digestion and proper functioning of the mind and intellect.

**Methods of treatment**

As described previously, the factors of pathogenesis are Dosha, Dushta, Srotas, Agni and Ama. The treatment is also based on the predominance of the above factors. Thus, lines of treatment are

(1) *Shodhana and Shamana*
(2) *Six upakramas*
(3) *Panca Karma, its Poorva-karma and Paschatkarma*
(4) *Santarpana and Apantarpana Chikitsa*
(5) *Niram-Karana*
(6) *Daiva-Vyapashraya, Yukti Vyapashraya and Satwa-avjaya*
(7) *Antaah-parimarjana, Bahir-Parimarjana and Shastra-pranidhan*
(8) *Dosha-prashamana and Dhatu-prashamana*
(9) *Vyadhi pratyanika chikitsa*
(10) *Srotas-shuddhikar chikitsa*
(11) *Swasthasya-ojaskara chikitsa*
(12) *Rasyana and Vajikarana chikitsa*
(13) *Pathya-Apathya chikitsa*
(14) *Vihar chikitsa*

The explanation of the above are as under.
Shodhana and Shamana line of treatment

Shodhana means purification of the body by eliminating morbid doshas and dushyas (body tissues) from the body through Vamana (emetics), Virechana (Purgation), Basti (enemata), Shirovirechana (Nasal medications) and Rakta-mokshana (Blood letting). It is also called pancha-karma or five fold line of treatment.

Shamana means subsidence of disease and symptoms.

It is stated that “the morbid doshas, eliminated by Shodhana therapy (Purificatory process) do not recur, but there are chances of recurrence of Dosha and Disease, treated with Shamana therapy.” But it is not possible to treat all the disease with Shodhana therapy due to various factors. In such cases Shamana therapy is prescribed. Shamana are (1) Kshut or Langhana (Fasting or light diet), (2) Trit (restriction of fluids (3) Vyayama (exercises including yogic exercises) Atap-Sevana (Sun rays), Maruta sevana (breeze of air) and also the symptomatic and other treatment for subsiding disease, Deepana and Pacana (Digestive and increasing metabolic processes).

Six Upkramas

Upkrama means methods of treatment. There are 3 pairs i.e. Six in number viz. (a) Langhana and Brihana, (b) Rukshana and Snehana, (c) Swedana and Stambhana.

The first of the 3 pairs i.e. Langhana, Rukshana and Swedana are meant for reduction of the body, Kapha and fat; while the 2nd of the pairs i.e. Birhana, Snehana, and Stambhana increase the body weight.

Langhana: That which produces lightness of the body is called Langhana. It is specially prescribed in the diseases caused by Ama and weak digestion. Langhana includes 4 types of purificatory processes viz., Vamana (Emetics), Virechana (purgatives). Asthapana Basti (enemetas with decoctions of medicinal plants), and Shiro-virechana (removal of Doshs from the head with the use of medicine administered through the nose); Trit-nigraha (restriction of fluids), Maruta Sevana (wind or air), Atapsevana (Sun’s rays), Pacana (digestives), Upavasa.
(fasting) and Vyayama (exercises including Yogic exercises). But out of these ten the first four are included in Shodhana therapy and the remaining six in Shamana therapy.

Brimhana: This is the reverse of Langhana. The line of treatment which increases body weight is called Brihmana.

Rukshana: Rukshana means the therapy by which the unctuous, sticky and fatty constituents of the body are dried up or rendered dry, this is called Rukshana.

Snehana: This is the reverse of Rukshana. The body elements, which are dry, are rendered oily or unctuous by Snehana. Snehana is done with 4 types of fatty substances viz Ghrit, Oil, Vasa (muscle fat) and Majja (bone marrow). The method of administration of Snehana are (1) by drinks and food, (2) by enematas with oil, and (3) through the skin by massage.

Swedana: Swedana means the procedure to induce sweating or perspiration. It may be brought about by heat or fire (with Agni) or even without application of heat (Niragni sweda). The types of Swedana where heat is necessary are four viz., Tap-sweda (application of dry heat), Ushma Sweda (application of steam), Upanaha Sweda (application of poultices etc.) and Drava-sweda (use of hot liquids). These 4 types are further divided into 14 types according to the method and articles used for Swedana.

Stambhana: The procedure by which the flow of fluids in the body is lessened or checked is called stambhana; e.g. use of grahi (astringents) in diarrhoea or polyurea and such other conditions.

These six are called Upakarmas. They comprise the entire field of therapeutics.

Panchakarma (Five types of treatment)

The Panchakarma line of treatment is meant to eliminate or excrete the vitiated Doshas from the body, thereby this line purifies the whole body. The diseases, in which the Doshas localize in Shakha (Dhatus and skin), these doshas are brought into the Koshta (alimentary tract) and then are eliminated.

The five-fold line of treatment according to one school of thought specially of physicians are (1) Vamana (Vomiting or emesis), (2) Virechana (purigation), (3) Anuvasana or Sneha basti
(enemetas with oil or fat), (4) *Asthapana* or *Niruha basti* (enemetas with decoctions of medicinal plants), and (5) *Shiro-virechana* or *Nasya* (removal of Dosha by medicines through the nose).

According to another school of thought, specially that of surgeons, *Pancha karma* are (1) *Vamana* (emetics) (2) *Virechana* (purigation) (3) *Basti* (enemetas both *Anuvasana* and *Asthapana*), (4) *Shiro-virechana* (use of medicines through the nose) and (5) *Rakta-mokshana* (Blood letting).

All the above methods, except *Anuvasana basti* are also included under *Shodhana* therapy.

**Poorva Karma**

Before starting any of the five fold elimination therapies, the patient is prepared for elimination. The preparation of the patient is called *Poorva-karma*. This includes *Snehana* (oleation) and *Swedana* (Sudation).

*Paschat Karma* (*After-treatment*) : After any of the *Pancha-karmas*, the patient feels exhausted and weak. For this reason and also for improving digestion, he is administered a diet gradually, so that his digestion and metabolism may improve, his stamina may increase. This is called *Paschat-karma* or after-treatment. It is also called *Sansarjana karma*.

**Santarpana and Apatarpana line of treatment** :

*Santarpana* means the food taken to satisfaction of the patient, while *Apatarpana* means the quantity of food which is not enough to fill the belly completely. *Santarpana* may or may not contain fat.

**Niram-karana**

On previous pages, *Ama* has been discussed. *Ama* is the product of improper digestion or metabolism. *Niram-karana* means the treatment to digest or remove these products of impaired digestion and metabolism. This is mainly done by *Langhana* (fasting or light diet) *Pachana* (digestive medicines), warm water etc.
Daiva-Vyapashraya Chikitsa (Divine therapy) etc.

*Daiva-vyapashraya Chikitsa* (divine therapy) diseases are not only physical or psychological. There may be certain other etiological factors also, which cannot be explained by any of the known methods. Such diseases, it is believed, are due to the curses of saints etc. or due to the entrance of someu nformed bodies like ghosts etc; Charaka, the pioneer of scientific medicine does not believe in such causes. He says 'neither gods, nor the *gandharvas*, neither the goblins (*Pishacha*), nor the demons nor aught else, torment man, who is not tormented of himself (*Nidan-7)*. Thus, he classifies these diseases to be psychological in origin. Still he gives the line of treatment in such disorders. Divine therapy consists of *Mantras* (Incantation), Certain divine herbs, gems, *Mangala* (rituals) *Bali* (oblations), *Upahara* (offerings), *Homa* (Sacrifice), *Niyama* (bows), *Prayashchitta* (ceremonial penitance), *Upavasa* (fasting), *Swasti-Ayana* (auspicious rites) *Pranipat* (Prostrations) *Gamana* (pilgrimages) etc.

*Yukti-vyapashraya chikitsa* (Scientific medicines) : This line of treatment consists of medicines and dietetic regimen.

*Satwa-avajaya* (mental control) : Mental control or psychological treatment consists of restraining oneself from the desire for *Ahita* (unholesome) objects etc.

The *Diatya-vyashraya and Satwa-avajaya* line of treatment are psychic treatments performed in ancient India. It is also, at some places, performed to-day not only in India but also in several other countries.

**Antah-parimarjana, Bahih-parimarjana and Shastra-pranidhana—**

**Lines of treatment**

*Antah-parimarjana* means internal purification. This consists of the medicines taken orally or internally for relief or cure of the diseases.

*Bahih-parimarjana* means external application of medicines. This procedure consists of *Abhyanga* (oil massage), *Swedana* (Sudation), *Pradeha* (applications), *Parisheka* (affusions), *Mardana* (massage) and such other lines applied to the external surface.
Shastra-pranidhana means operative treatment. This consists of chhedana (excision), Bhedana (incision), Vyadhana (Puncturing), Darana (rupturing), Lekhana (scraping or erasion), Utpatana (eradication), Prachinana (plastic operation), Seevana (suturing), Eshana (sounding and the application of leeches and caustics etc.

Dosha Pratyanika, Dhatu Prashamana and Vyadhi Pratyanika—Line of treatment

Dosha Pratyanika: Pratyanika means antagonistic. Dosha pratyanika is antagonistic to provoked Dosha e.g. use of oil and/or Basti in Vata disorders, use of ghee and/or Virechana (purgation) in Pitta disorders and the use of honey and/or Vamana in Kapha disorders.

Dhatu Prashamana: means that line of treatment, which acts on vitiated Dhatu (tissues) e.g. blood-letting in diseases of blood and skin disease.

Vyadhi Pratyanika Chikitsa: Means that line of treatment which directly acts on diseases. Charaka has given for this 50 decoctions, each containing 10 medicinal herbs for 50 diseases, according to the action of the medicine.

Srotas—Suddhikara Chikitsa

As discussed in factors of pathogenesis, the Srotas (body channels) become pathologic. Srotas are innumerable but for the sake of practical use, Srotas have been classified in 13 types according to the flow of materials through them. The characteristics of the morbidity of Srotas are (1) Atipravritti (increased flow), (2) Sanga (obstruction), (3) Sira-granthi (Knotted condition), and (4) Vimarga-gamana (flow in reverse direction).

The line of treatment to purify the Srotas, to get normal flow of the flowing material and to make the morbidity subside is called Srotas-shuddhikara Chikitsa.

Pathya—Apathya

Pathya means the diet and other regimen which are suitable in health and disease.
Apathya means the diet and other regimen which are not suitable or which may provoke the disease.

Ayurveda lays a very great emphasis on Pathya-Apathya i.e. regulations of diet etc. It is to that extent that acharyas say "If a man uses Pathya (wholesome diet etc.), there is no need of any medicine. And if the patient does not observe Pathya and indulges in Apathya, the medicines will not act." Hence, it may be said that the treatment can be carried out only by regulated and wholesome diet, without the use of medicine.

Vihara means the procedures and routine to be observed during health and disease, e.g. in condition of fever of recent origin, one should avoid sleeping during the day, bath, oilmassage, food, sex act, anger and excitement, direct breeze, exercise etc. He should on the contrary take complete rest, keep mental control, fasting and so on. In this way, Vihara includes the procedures to be followed during disease and health.

Rasayana or Swastha-ojasker treatment

Swastha means a physically, psychologically and spiritually healthy person. Ojas is considered to be responsible for vitality, resistance, complexion etc. The line of treatment which increases physical, mental and spiritual strength is called Swesth-ojasker treatment.

Rasayana means that line of treatment which controls aging process, prevents disease, increases vitality and brings healthy long life. In short it may be said that Rasayana may not add years to one’s life but may add life to the years.

Vajikarana means that line of treatment, which increases pleasure in the sex act. It is very near to aphrodisiacs.

It is however, for the physician to select which line of treatment, will be suitable to the patient for the relief or cure the disease. The physician has to treat the man as a whole and not just one organ or system of the body. He has to see the body, mind and spirit during diagnosis and treatment.
Summing up, one might succinctly say with Charaka: “The learned physician, who is unable to win his way into a patient’s heart by the light of his scientific understanding is not entitled to treat disease.” (Viman-4).
Fistula-in-ano and piles form the greatest percentage of diseases pertaining to the ano-rectal region. Of these the former is a disagreeable condition for the patient and often creates problems which become a source of his restlessness. The disease has not been known to have any particular racial affinity and has a uniform distribution throughout the world.

History suggests that the condition ‘fistula-in-ano’ is an age-old problem and that the operations for this disease were designed from time to time to suit the needs of the times. However, the earliest systematic treatise on this subject has been written by John Arderne in 1339 who recounted systematically the steps of the operation. It was he who first took resource to the knife and believed in laying the tract open with a director and a bistury. In the 14th century, the surgical treatment for fistula was popularised as fashion of the day in France, after the successful treatment of fistula-in-ano of King Louis XIV by Surgeon Charles Felix, who was a barber surgeon at the court of the King and received a huge sum from him as a reward for the operation. This made the operative treatment of choice and the fourteenth century was regarded as the golden age of rectal surgery.

Later in the eighteenth century, Percival Pott in his book on fistula-in-ano emphasised the need for exposing the fistulous tract by incision as mentioned by Arderne. Still later, for some time, the operative treatment was replaced by ligaturing the fistulous tract with strong silk or with India rubber ligatures. In the later part of the previous century and also in the early part of this century, fistula was treated by injections of irritant chemicals into the tract such as 3-4 per cent silver nitrate, bismuth paste and a combination of quinine and urethane. None of these procedures were satisfactory.
and could not stand the test of the time, and Frederick Salmon soon came with his modification of the classical incision of fistulae, claiming better results. Further modifications of this technique were added by Salmon and his successors Lickhart-Mummary, Milligan, Morgan and Gabriel, at St. Mark's Hospital.

Changing trends in the treatment were due to the fact that none of the methods proved satisfactory and recurrence of the disease was rather the rule. This was mainly due to site and the frequency of combination of the disease-bearing area. In spite of the best efforts even today, the main problems faced in the treatment of this disease, are: (i) extensive mutilation of the ano-rectal and ischio-rectal area which is a prerequisite for radical cure, (ii) prolonged hospitalization, (iii) high rate of recurrence.

The present trend in the treatment of fistula-in-ano lies in radical excision of the tract with removal of a major portion of the surrounding tissue. This is a very bold step and unfortunately the poor patient has to be a victim of a widespread surgical wound which poses various problems in healing in comparison to other wounds. The dressings in the post-operative period are painful and have to be meticulous to avoid recurrence of the disease. It is probably because of this reason that the frequency of recurrence in spite of the radical excision, rates pretty high in this disease. Jackman in 1944, reported a study of five hundred cases of fistula-in-ano from the Mayo Clinic. 215 patients in the study (i.e. 43 per cent) had to be subjected to repeated surgery while some of these had to be operated on as many as fourteen times. The gravity of the problem of the operative treatment is best judged from the conclusion of John McGivney that "the operative procedures for ano-rectal fistula can be a challenge to the most ingenious surgeons." Further, he mentions the high frequency of failure of surgical treatment in this disease. It will not be an exaggeration to comment that the chances for permanent cure in a case of fistula-in-ano after surgery do not exceed fifty per cent even with the most liberal estimate.

Besides a high rate of recurrence, the operation of fistula-in-ano is usually followed by an unusually long period of
convalescence during which the patient has to stay in the hospital and undergo a painful procedure of surgical dressing once or twice every day. While the dressing itself offers an ordeal for him and scares him, the patient also has to suffer economic loss as he has to be away from his job and society as a result of prolonged hospitalization. It is true that attempts are being made to minimize the period of convalescence by primary closure of the wound and by skin grafts etc; but the results of these techniques are still controversial.

Extensive excision of tissues essential to achieve radical cure is again a point of vital importance which goes against the choice of operative treatment of fistula-in-ano. Even for a small tract, the extent of the excision of tissues has to be sufficiently wide in order to let the wound heal from the apex to avoid the formation of any pocket inside. If the fistulae are multiple, the extent of the wound excision goes even beyond imaginable limits and a major portion of the buttock has to be removed. This mutilating surgery not only produces an ugly appearance of the part, but also results in a number of post-operative complications. Some of these complications like sphincteric incontinence, stenosis, proctitis and fissure-in-ano have a difficult course and make life of the patient worse than it was before the operation. Thus, the surgical treatment of fistula-in-ano still presents a number of practical problems which stand as a challenge to the modern medical world. No doubt, some fistulae respond to surgery satisfactorily, but the overall picture of response is highly disappointing. Hence, it gives enough scope to devise a technique which would cure this disease in a reasonably shorter time, avoid recurrences and extensive mutilating surgery and also prove economically better.

The present work is an attempt to fulfil these ideal requirements. The technique adopted in this is the revival of an age-old procedure practised by ‘Sushruta’, the eminent Indian surgeon, who lived sometime between 1000 to 800 B.C., with necessary modifications based on the knowledge of recent surgical developments. The method is non-operative and belongs to the para-surgical group of measures. It involves the application of a specially prepared medicated thread processed with certain vegetable caustics. The thread is
passed into the fistulous tract, tied outside the anal aperture and left in situ for seven days after which it is changed and retied. The patient is sent home after every sitting and is advised to continue his routine work as usual. In due course of time, the thread falls out spontaneously and the fistulous tract is simultaneously healed. The resultant scar formation is very minimal and the method is safe and free from any complications.

Preparation of Threads

The threads are prepared on surgical linen size 20 by repeatedly smearing it with the latex of euphorbia nerifolia and a combination of certain vegetable caustics grown on a large scale in India and other parts of Southern Asia. These substances are:

1. Fresh latex collected from the plant euphorbia nerifolia (euphorbiaceae family) by stabbing the stem at various places (Figure 1).

2. A specially prepared alkaline powder derived from the plant achyranthes aspera (amaranthaceae family). This powder is obtained by the evaporation of the filtered solution of burnt ashes of this plant in water. This method is indigenous to the Indian system of medicine and is termed ‘Ksharapatan.’ The powder thus obtained, is also caustic and is locally used as a debriding agent in chronic non-healing ulcers. It has a pH range of 8 to 9.2.

3. A fine powder of the dried rhizomes of curcuma longa, (ascitaminaceae family). These rhizomes are commonly used as an ingredient of cooking spices and are commonly termed as turmeric.

The processing of the thread is done inside a specially designed cabinet.

2. This cabinet is provided with a device for hot blast for drying the threads and an ultra-violet light for sterilization. The temperature of the chamber is recorded with the help of a thermometer. The cabinet contains 25 hangers on which the surgical linen No. 20 is spread and hooked throughout. After the thread is properly hooked onto the hanger, it is soaked with the fresh latex of the plant mentioned above and the
hanger replaced into the cabinet for drying. When dry, it is again re-soaked in the same manner in a fresh material, and the process is repeated for as many as seven times. When this part of the procedure is complete, the next seven coatings are done with the latex and the alkaline powder simultaneously in the same way, the threads are passed into the alkaline powder after processing with latex, thus permitting the articles of the powder to stick over the wet thread, after which it is allowed to dry. In the final phase of the preparation of thread, the remaining seven coatings are similarly done with the latex and turmeric powder. During the processing, the threads are sterilised by U.V. light. The tubes (Figure 3) are marked for the date of preparation, length of the thread and are sealed.

Selection of Patients

The patients were selected from the ano-rectal clinic of S.S. Hospital, Banaras Hindu University. Most of these patients came with a primary complaint of a chronic discharging sinus in the peri-anal region, while others were referred from the other clinical departments of the hospital with a diagnosis of ‘fistula-in-ano’. Of the referred patients, there was a good number of cases who had undergone an operative treatment either for an abscess or for the fistula-in-ano, and on recurrence of the disease were later referred to be subjected to this special caustic ligature. The cases were examined carefully and properly recorded on a specially designed proforma.

As a rule, the treatment is considered to be effective in all types of fistula-in-ano, but some patients for whom it was technically impossible or difficult to apply a thread were considered unfit for this treatment. These included fistulas which either exceptionally high or presented a number of openings on the surface. One can mention here that it was possible to apply this thread in some high rectal fistulae cases under general anaesthesia. Similarly, many patients possessing multiple fistulae have also been treated by this method. Still, the cases who are customarily described to have a ‘water-can’ appearance were not considered fit for this treatment. Besides this, patients having an associated serious pathology e.g. rectal
carcinoma, active tuberculosis, advanced anaemia, associated diabetes etc. were taken only after controlling the general condition. Similarly, pregnancy was considered an unsuitable period and treatment at such a time is best avoided.

In spite of the preceding limitations, it was realized that the number of patients who were admissible to this treatment constituted the majority of the total number of the patients suffering from this disease. The number of patients who refused this treatment was very small. The majority of those patients who suffered from a simple single fistula can be benefited by this most convenient method of treatment.

Method of Application of Thread

After the patient is examined thoroughly and selected for this treatment, routine investigations are completed and in selected cases the fistulogram is also done. He is advised to take a mild aperient a night prior to the application of the thread, in order to have clean bowels and to attend the ano-rectal clinic the next morning. For application of the thread, the patient is placed in the lithotomy position and the perineum is cleaned with antiseptic lotions and draped with sterile towels. A tray containing sterilized instruments including specially designed probes of different sizes, is kept ready on the right side of the surgeon. The index finger of the left hand is then gently introduced into the rectum and the inner opening of the fistula is located as far as possible. The selected probe is then passed through the external opening of the tract and is slowly pushed in the direction of least resistance. The tip of the probe is guided by the finger in the rectum in order to avoid formation of a false passage. Care is also taken to explore the entire length of the fistula. The probe is thus guided into the anal canal through the internal opening of the tract and is finally brought out of the anal aperture by rotating the handle of the probe slightly or by depressing it. In cases of blind external fistulæ, it is sometimes necessary to use mild force to pierce the anal canal at a point which is most bulging and close to the rectal mucosa. A fresh and sterilized thread from the sealed tube is threaded through the projecting eye and the probe pulled out thus leaving the thread
in the fistulous tract. The two ends of the thread are tied outside the anal orifice firmly. It may be mentioned that, this is a painless process and the patients do not need any anaesthesia for initial passing or successive change of the thread. It is important to tie the thread neither too tight nor too loose, since a tight thread will cut through the tissues rapidly and thus will not permit the desired action of the caustics on the fibrous wall of the fistula. A too loose thread will not cut through the tissues at all and will unnecessarily hamper healing of the wound. A moderately firm grip of the thread is just sufficient to give optimum, desired results. After the thread is applied, the wound is dressed with anti-inflammatory and analgesic drugs in oily base and the patient is sent home with medicines and instructions to be carried during the next seven days, after which he is again called and the thread is changed.

He is advised to take a simple diet and adjust his bowel movements by a mild aperient for the next 4 days. He is advised to take sitz baths for 10-15 minutes every day during the first week.

Changing of the thread requires no special technique. A fresh thread is tied to the original thread near the knot and is guided gradually through the other end by rail road technique. The previous thread is removed and replaced by a fresh one. The changing of the thread is done at weekly intervals till it spontaneously falls out. The length of the thread removed at every sitting is measured and results plotted on a graph. This gives an idea of the rate of cutting in each individual. It is to be emphasized at this point that the cutting through the tissues is usually synchronous with the healing of the wound; that is to say, that the wound produced by the thread in one week's time simultaneously heals up completely during the next week while the fresh wound is being created by the migrating thread. In some cases, where the healing and cutting are uncoordinated, the cutting is controlled by loosening or tightening the grip of the thread and changing the threads at suitable intervals. In majority of the cases the healing and the cutting are well coordinated in one week's time.
Material and Methods

The material in this study consisted of 700 patients of fistula-in-ano treated by Kshara Sutra. The patients belonged to all age groups, different occupation, dietary habits and sex. An attempt was made to find out a relation if any, between three factors and the incidence of fistula-in-ano. Most of these patients were selected from the anorectal clinic of the department while some of them were referred from other sister departments of the hospital and the Institute of Medical Sciences. The difficult cases were subjected to various investigations out of which 'fistulography' was the usually employed procedure. Special techniques were developed to find out the relation of the fistulous tract and its internal opening with the anal sphincter and the rectum. The other investigations were 'biopsy' and the 'culture' studies of the infective organism. No antibiotics were used in any case.

The Kshara Sutra was prepared in the laboratory of Shalya-Shalokya department according to the methods described in previous publications. The application of Kshara Sutra was undertaken with the patient in lithotomy position. The area was very well cleaned and draped and a specially designed probe was passed into the fistulous tract to negotiate a finger in the rectum through its internal opening. The tip of the probe was manipulated towards the anal orifice and the eye was threaded with Kshara Sutra. The probe was then withdrawn leaving the thread in the tract. The ends of the thread were now snugly tied outside the anal orifice and the wound was dressed with a medicated oil, usually Vishyandan Taila. No anaesthesia was normally required though in some difficult cases they were threaded under general anaesthesia. The patient was given a mild aperient for the following week in order to have an easy motion.

The thread was left in for one week and the patient was sent home with special instructions to keep active and not to restrain from hot sitz bath after each defaecation and apply the dressings himself which was a very simple procedure. No diet restrictions were made in any case except those who had associated other systemic disorders like diabetes mellitus, tuberculosis etc. The thread was changed every week by the
simple rail-road technique and the length of the previous thread was measured each time and plotted on a graph. This helped in managing a balance between the rates of cutting and the healing. If the healing was slow, the thread was not allowed to advance further by loosely tying the loop or vice-versa. This procedure was repeated till the thread fell out spontaneously by cutting through the tissues leaving behind a small subcutaneous wound only which healed within the next few days.

Observations

In the present paper, stress has been laid upon the socio-economic and general factors regarding the etiopathogenesis of the disease, such as dietary habit, sex, age, nature of occupation, role of cycling etc. These factors have found very little or no mention so far in the study of this disease. (Table I).

<table>
<thead>
<tr>
<th>Age groups in years</th>
<th>No. of cases</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>8</td>
<td>1.1</td>
</tr>
<tr>
<td>11-20</td>
<td>61</td>
<td>8.7</td>
</tr>
<tr>
<td>21-30</td>
<td>200</td>
<td>26.6</td>
</tr>
<tr>
<td>31-40</td>
<td>192</td>
<td>27.4</td>
</tr>
<tr>
<td>41-50</td>
<td>140</td>
<td>20.0</td>
</tr>
<tr>
<td>51-60</td>
<td>69</td>
<td>9.9</td>
</tr>
<tr>
<td>61-70</td>
<td>25</td>
<td>3.6</td>
</tr>
<tr>
<td>Above 70</td>
<td>5</td>
<td>0.7</td>
</tr>
</tbody>
</table>

In the present series of 700 cases it has been observed that this disease most commonly occurs in the 3rd, 4th and 5th decades of life (76%) (Table I) although the minimum age of a patient treated was 6 months and the maximum age of 80 years.

According to the sex distribution, the male patients were found to suffer about ten times more (90.6%) than the female patients (9.4%) from this disease. (Table II).
Table II: Sex Distribution

<table>
<thead>
<tr>
<th>Sex distribution</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>634</td>
<td>90.6</td>
</tr>
<tr>
<td>Female</td>
<td>66</td>
<td>9.4</td>
</tr>
</tbody>
</table>

As regards the nature of occupation and dietary habit, not much of difference was observed in the treated cases. The patients who had active occupation involving physical labour such as agriculturists and labourers accounted for about 51% of the cases against those who had sedentary profession (49%) which included clerks, teachers shopkeepers and businessmen. Similarly 51% of the total 700 patients were vegetarians and 49% non-vegetarians in their dietary habit. This shows that nature of occupation and diet, contrary to the belief, do not play any major role in the causation of fistula-in-ano (Tables III & IV).

Table III: Dietary Habit

<table>
<thead>
<tr>
<th>Status</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetarian</td>
<td>358</td>
<td>51.1</td>
</tr>
<tr>
<td>Non-vegetarian</td>
<td>342</td>
<td>48.9</td>
</tr>
</tbody>
</table>

Table IV: Occupation Incidence

<table>
<thead>
<tr>
<th>Name of Occupation</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active</td>
<td>358</td>
<td>51.1</td>
</tr>
<tr>
<td>Sedentary</td>
<td>343</td>
<td>48.9</td>
</tr>
</tbody>
</table>

This study also showed the fact that daily habit of cycling predisposes to the causation of fistula-in-ano. About 44.6% patients gave no history of cycling in their daily routine while about 55.4% patients were such, who gave history of daily cycling ranging from below five miles to more than ten miles (Table V).

Table V: Average daily cycling

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Status of cycling</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No cycling</td>
<td>312</td>
<td>44.6</td>
</tr>
<tr>
<td>2.</td>
<td>Upto 5 miles</td>
<td>192</td>
<td>27.4</td>
</tr>
<tr>
<td>3.</td>
<td>5-10 miles</td>
<td>140</td>
<td>20.0</td>
</tr>
<tr>
<td>4.</td>
<td>About 10 miles</td>
<td>56</td>
<td>8.0</td>
</tr>
</tbody>
</table>
The factor of disease consciousness amongst patients and its eradication at the earliest opportunity also attracted our attention. The analysis on this point revealed that 56.2% patients came to get relief from the disease within a few months to one year, 24.9% patients within 1 to 3 years, while 18.9% of the patients waited more than three years for consultation and getting cure from the disease (Table VI).

<table>
<thead>
<tr>
<th>Duration of disease</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 1 year</td>
<td>394</td>
<td>54.2</td>
</tr>
<tr>
<td>1-3 years</td>
<td>174</td>
<td>24.9</td>
</tr>
<tr>
<td>Above 3 years</td>
<td>132</td>
<td>18.9</td>
</tr>
</tbody>
</table>

But, this last mentioned group of patients also included those who had undergone previous unsuccessful operations upto four times before taking up this method of treatment. About 27.4% of the cases had tried to get cure from surgical operations previously (Table VII). It was the repeated recurrence in these cases which prompted them to opt for this treatment. However, while the recurrent fistulae also heal completely with Kshara Sutra treatment, the rate of cutting in these cases is much slow and the final scar formed is also larger than in the previously unoperated patients.

<table>
<thead>
<tr>
<th>Operations</th>
<th>No. of cases</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh cases</td>
<td>508</td>
<td>72.6</td>
</tr>
<tr>
<td>Prev. operated cases</td>
<td>192</td>
<td>27.4</td>
</tr>
</tbody>
</table>

The most significant observation never brought to light hitherto, had been the distribution of external perianal openings of the fistula-in-ano tracts. Considering perianal areas as a clock while the patient is lying in lithotomy position, it was observed that the posterior hemisphere, so to say, has the maximum number of openings (67.5%). Similarly, left lateral hemisphere accounts for (59.3%) of external opening, thus making left posterior quadrant the most favouring site for fistula to open (about 36.9%). But for pelvi-rectal variety of fistulae, right anterior quadrant com-
petes parallel to the left posterior quadrant whereas generally the former is the least common quadrant opening of rich anterior quadrant is notorious to end up in pelvi rectal fistulae in most of the cases. (Tables VIII & IX).

Table VIII: Position of fistulae

<table>
<thead>
<tr>
<th>O'clock position</th>
<th>No. of cases</th>
<th>Percentage</th>
<th>Quad. Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>34</td>
<td>4.10</td>
<td>184</td>
</tr>
<tr>
<td>II.</td>
<td>60</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td>III.</td>
<td>90</td>
<td>10.86</td>
<td></td>
</tr>
<tr>
<td>IV.</td>
<td>75</td>
<td>9.95</td>
<td></td>
</tr>
<tr>
<td>V.</td>
<td>137</td>
<td>16.54</td>
<td>306</td>
</tr>
<tr>
<td>VI.</td>
<td>94</td>
<td>11.34</td>
<td></td>
</tr>
<tr>
<td>VII.</td>
<td>133</td>
<td>16.06</td>
<td></td>
</tr>
<tr>
<td>VIII.</td>
<td>78</td>
<td>9.42</td>
<td>253</td>
</tr>
<tr>
<td>IX.</td>
<td>31</td>
<td>3.70</td>
<td></td>
</tr>
<tr>
<td>X.</td>
<td>43</td>
<td>5.19</td>
<td>85</td>
</tr>
<tr>
<td>XI.</td>
<td>11</td>
<td>1.32</td>
<td></td>
</tr>
</tbody>
</table>

Table IX

<table>
<thead>
<tr>
<th>Quadrants</th>
<th>Low Anal Percentage</th>
<th>Pelvi Rectal Percentages</th>
<th>Overall Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Anterior</td>
<td>20.80</td>
<td>17.40</td>
<td>22.326</td>
</tr>
<tr>
<td>Left Posterior</td>
<td>39.00</td>
<td>30.40</td>
<td>36.94</td>
</tr>
<tr>
<td>Right Posterior</td>
<td>30.70</td>
<td>21.80</td>
<td>30.55</td>
</tr>
<tr>
<td>Right Anterior</td>
<td>9.50</td>
<td>30.40</td>
<td>10.25</td>
</tr>
</tbody>
</table>

The incidence of different varieties of fistula-in-ano found is our series have also been compared with that of the St. Mark's Hospital series of 328 patients. Except for the pelvi-rectal and subcutaneous varieties of fistulae the studies do not show much of difference. Subcutaneous variety in our series has been 15.3% as compared to 3.7% found in St. Mark's Hospital series. Similarly, the pelvi-rectal fistulae in our series is 27% as against 5.1% in St. Mark's Hospital series. But considering high anal and pelvi-rectal varieties collectively the incidence in our series becomes 28.3% while it is 20.1% only in the St. Mark's Hospital series. (Table X).
Table X: Type of Fistulae

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Incidence of</th>
<th>% our series</th>
<th>% St. Mark's</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>varieties</td>
<td></td>
<td>Hosp.</td>
</tr>
<tr>
<td>1.</td>
<td>Submucous</td>
<td>3.0</td>
<td>3.7</td>
</tr>
<tr>
<td>2.</td>
<td>Subcutaneous</td>
<td>15.3</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Low Anal</td>
<td>53.4</td>
<td>76.2</td>
</tr>
<tr>
<td>4.</td>
<td>High Anal</td>
<td>25.6</td>
<td>15.0</td>
</tr>
<tr>
<td>5.</td>
<td>Pelvi-Rectal</td>
<td>2.7</td>
<td>5.1</td>
</tr>
</tbody>
</table>

It is interesting to note that out of 805 total registered cases, about 65 cases had to be abandoned, being not fit to be put on Kshara Sutra Treatment because of some personal reasons of the patients and due to the fact that some patients also had some other rectal disorders viz. fissure, haemorrhoids etc. Further about 40 patients were such who did not turn up for further treatment after first or second application of Kshara Sutra. (Table XI).

Table XI: Results of Treatment

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Overall studies of 805 cases</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cases registered</td>
<td>805</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>Cases treated with K.S.</td>
<td>700</td>
<td>87</td>
</tr>
<tr>
<td>3.</td>
<td>Cases unfit for K.S. treatment</td>
<td>65</td>
<td>8.1</td>
</tr>
<tr>
<td>4.</td>
<td>Cases discontinued</td>
<td>40</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Results

The figure No. shows that out of 700 patients treated by this technique only 9 (1.3%) cases had recurrence over a follow-up of 1-10 years while 691 (98%) patients had complete cure. When these are compared with the post-operative results and recurrence rate quoted by various international clinics, the stupendous magnitude of the cure of such a dreadful disease could be evidently gauged. And that is not all; the cured cases are followed up after the cure and the overall response to the follow-up is 59.0%.
Table XII

<table>
<thead>
<tr>
<th>Follow up response</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>700</td>
<td>(\ldots)</td>
</tr>
<tr>
<td>Follow up response</td>
<td>413</td>
<td>59.0</td>
</tr>
</tbody>
</table>

NOTES

1. Incidence of various types of fistula in our study is comparable with the standard series of St. Mark's Hospital.
2. About \(\frac{2}{3}\)rd of Fistula open posterior to a transverse line bisecting the anal orifice.
3. Right Anterior Quadrant is favourable site of pelviurectal variety though fistula is less common in this region.
4. Diet and physical labour do not specifically contribute to the aetiology of fistula.
5. True tubercular fistula is comparatively a rare entity.
6. K.S. treatment is equally effective in all varieties of fistula including cases of operative recurrence.
7. It has minimal recurrence (1.3\%) as against other reported
METABOLIC CONCEPT IN AYURVEDA

G.N. CHATURVEDI

It is generally believed by scholars of modern medicine that the concept of metabolism was not properly understood by the ancient medical sciences of the world. But to an impartial observer the fact is otherwise. Indeed, the Ayurvedic system of medicine has dealt with the concept of metabolism in a surprisingly greater detail than one would expect. Though the references on this topic lie scattered throughout the entire classics of Ayurveda viz. Charaka Samhita, Sushruta Samhita and Ashtanga Hridaya and Samgraha, the basic source material is expounded in the 15th Chapter of Chikitsa Sthan of Charaka Samhita. The title of this chapter is Grahani Dosha Chikitsa (the treatment of intestinal disorders).

The Metabolic Factor (Agni)

Some technical terms related to the concept of metabolism in Ayurveda need clarification, before the concept is discussed in detail. The pivot of the metabolism is Agni. Agni literally means fire. But here it has been used in a technical and therefore special sense. Charaka says that the Agni is responsible for the life-processes, complexion, strength, health, energy, anabolism (Upachaya), glow, vital essence (Ojas), lustre, body heat and life-breaths. Food is properly digested and metabolised by Agni. The food that we eat can nourish the body through Agni alone and not by itself. So much so that the life and death of an individual depend on the proper or improper functioning of Agni (Charaka Chikitsa, 15, 3-5). Thus Ayurveda has attached great importance to the proper functioning of Agni for the preservation, promotion and maintenance of good health. Ayurveda believes that all the diseases are caused by the derangement of Agni
with special reference to gastro-intestinal disorders (*Udara Roga*). The therapeutic system of Ayurveda tries to improve the proper functioning of *Agni* through drugs, diets, exercise and mental control.

**Types of Metabolic Factor (Agni)**

Thirteen types of *Agni* have been described by Charaka. The central position amongst them is occupied by *Jathara-Agni*—the gastro-intestinal secretion, enzymes, hormone etc. Then five more types of *Bhuta-Agni* have been enumerated. *Bhuta*, here means the physico-material classification of food and body elements. These are five in number, viz. earth (*Prithvi*), water (*Jala*), Fire (*Agni*), Wind (*Vayu*) and Ether (*Akash*). Each has its own *Agni*, therefore, they are five in number. *Bhuta-Agni* bears some resemblance to the intermediary metabolism of modern medicine. Thereafter, seven types of *Dhatu-Agni* have been expounded. *Dhatu* here means the basic elements of the body. They are seven in number viz. *Rasa* (plasma), *Rakta* (blood), *Mamsa* (muscle), *Meda* (fat), *Asthi* (bone), *Majja* (bone-marrow) and *Shukra* (semen). Each *Dhatu* or tissue has its own *Agni*. The functions of these seven *Dhatu-Agni* refer to tissue metabolism in modern parlance. In sum, the central gastro-intestinal metabolic factor (*Jathara-Agni*), five intermediary metabolism factors (*Bhuta-Agni*) and seven tissue metabolic factors (*Dhatu-Agni*), constitute the thirteen types of *Agni* or the metabolic factors of Ayurveda.

**Sequence of Metabolic Phenomena**

From the perusal or Ayurvedic literature, it may be found that the food material is first digested and absorbed by the *Jathara-Agni* in the gastro-intestinal tract. Thereupon it is transported to the liver for *Bhuta-Agni Paka* and from there the product of nutrition is processed in the tissues by the *Dhatu-Agni*. In this process of digestion and metabolism two types of products are available. The one having the nutritive property is called *Prasada* and the other which is waste product called *Kitta*. Charaka says that in this way the formation of nutritive substances (*Prasada*) and waste products (*Kitta*)
from the combustion of tissue occurs. They support one another and maintain the continuity of mutual association and nourishment of the body tissues *(Charaka Chikitsa, 15, 19).*

**The Product of Defective Metabolism (Ama)**

It is obvious from the above description that the metabolism or *Agni-Vyapara* may be defective at three levels, that is, at the level of gastro-intestinal tract, at the level of intermediary metabolism in the liver and at the level of tissue metabolism. This product of metabolic defect is technically called *Ama.* *Ama* literally means unripe. In the context of metabolism, it would mean incomplete or defective metabolism. Dietetic factors such as under-nutrition (*Abhojana*), over-nutrition (*Atibhojana*), malnutrition (*Vishama-Asana*), incompatible diet (*Asatmya Ahara*), infected food material (*Dushta-Bhojana*) are responsible for the production of *Ama-Visha* i.e. defective gastro-intestinal metabolic products. In addition, anything which is against the socio-cultural habits of the diet and climate of people may also produce defective metabolism. Even chronic illnesses leading to emaciation are also responsible for the causation of defective *Agni-Vyapar.* Says Charaka:

The gastro-intestinal tract thus being vitiated does not digest and metabolise even the lightest food and the food being undigested and unmetabolised, turns sour and acts like a poison. *(Charaka Chikitsa, 15-44).*

The general signs and symptoms of defective metabolism would be intestinal stasis, depression, headache, fainting, giddiness, stiffness of the back and waist, yawning, bodyache, thirst, fever, vomiting, loose motion, anorexia and maldigestion *(Charaka Chikitsa 15, 45-46).* In addition to the above signs and symptoms, the *Ama* or the product of defective metabolism will have specific signs and symptoms depending upon the level of the production of deranged metabolism.

**The Diseases of Defective Metabolism (Ama):**

Acute diseases like gastro-enteritis (*Visuchika*) intestinal
stasis (Alasaka) have been described due to Ama-visha (Charaka, Vimana 2). One of the common chronic metabolic diseases is Amavata. This disease has been described by Madhava in his book Madhava Nidana, claimed to be composed in the 7th century A.D. It is produced due to gastro-intestinal Ama and is characterised by polyarthritis and bears a clinical resemblance to rheumatoid arthritis (Madhava Nidana 25, 1-12). A similar type of disease has been described which is known as Vatarakta. This disease appears to be caused due to defective metabolism of blood (Rakta). The clinical description of this disease is similar to gout. The other gastro-intestinal disorder is Ama-Aitisara which may be compared to the mucus colitis. A group of diseases have been described which can be produced due to overnutrition (Samtarpana). The common diseases in this category are obesity and diabetes mellitus (Charaka Sutra 21). Another disease which resembles thyrotoxicosis has been described by the name of Bhasmaka or Tikshnagni. In this disease the patient appears to be lean and thin even though he eats too much due to an abnormally high appetite (hyperphagia). These are a few examples of the metabolic diseases described in Ayurveda.

Principles of Treatment

The Ayurvedic system of medicine believes that if the Agni-Vyapara or metabolic functions of the body are properly maintained, there will be fewer chances of disease. Therefore, the proper gastro-intestinal function, the seat of Jathara-Agni, is essential for the metabolic function of the body. Drugs, diet and exercise which improve the function of gastro-intestinal Agni are advocated for the treatment of metabolic disorders. Chitraka (Plumbago zeylanica), and Kupili (Strychnos nux-vomica), Pippali (Piper longum), Ardraka (Zingiber officinale), Jiraka (Cuminum cyminum), Shatpushpa (Foeniculum vulgare), Dhanyak (Coriandrum sativum), Rasona (Allium sativum), etc. have been extensively used in medicinal preparations meant for metabolic disorders. Haritaki, (Terminalia chebula), Amalaki (Emblcia officinalis), Rasna (Pluchea lanceolata), Guggulu (Commiphora mukul), Amrita (Tinospora cordi-
folia), Bhallataka (Sericarpus anacardiun), Kutaki (Picrorhyza kurroa), Chirayata (Swertia chirata), Nimba (Azadirachta indica) and Shilajatu etc. are another group of drugs commonly employed for the treatment of metabolic disorders.

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THE PHARMACOLOGICAL ASPECT OF AYURVEDA

S.C. DHYANI

Dravyaguna is the science of drugs (Dravya), their properties and actions (Guna). It embodies various aspects of knowledge about the identification, properties, actions, uses, dosage, compatibility and processing of drugs and thus, the pharmacog-pharmacology, therapeutics and pharmacy form the parts of Dravyaguna. Later, the pharmacy developed into a separate branch under the name of Rasashastra and Bhaisajya Kalpana (Science of minerals and pharmaceutical processings).

The drug (Dravya) performs certain actions (Karma) by virtue of its properties (Guna), which exist in it in a state of co-inherence (Samavaya). The uniformity of the basic constituents (Panchmahabhutas) of the drug and diet on the one hand and the body components on the other forms the basis of the principles of similars and dis-similars implying thereby, that the similar Panchabhautika constituents of the drug and diet will increase the similar Panchabhaukita constituents of the body (Samanya) and the dis-similars will decrease the dis-similars (Vishesa). Thus the study of six Padarthas gets practical application in Dravyaguna.

Definition and Scope of Drug

The substance, wherein exist the properties and actions in an inseparable relationship, is called Dravya. The properties and actions have no identity or existence without the substance and the substance has no cognizance or recognition without the properties and actions (Samavaya-relationship). Indian philosophy recognises evolution preceded by involution and, therefore, the order of evolution of the Panchamahabhutas is also the order of their quantitative and qualitative involution.
resulting in the manifestation of the grosser substances we use as drug or diet. All the substances are composed of the Panchamahabhutas and, therefore, can be exploited as drugs to correct any imbalance in the Panchabhdutika constituents of the body.

The plant kingdom preceded the animal kingdom in the process of evolution. Man learnt medicine by intuition, imitation and, later, by instruction. The ancient sages applied their wisdom, out of necessity, to the plant kingdom so as to exploit it for the benefit of the humanity. The Rigveda, and more so the Atharvaveda, contain descriptions of plants and parasites, diseases and drugs, principles and practices to prevent and eradicate the diseases and to preserve and fortify the health. There is a vivid description and classification of drugs and diet on the basis of source, morphological characters, properties, actions, uses etc., in the Ayurvedic Nighantus.

After making exhaustive and critical observations, the ancient sages made some generalisations known as the five principles of Dravyaguna, viz., Rasa-Guna—Veerya—Vipaka—Prabhava. The modus operandi of the drug is to be explained on the basis of these five principles only, which we shall deal with later.

The role of the Panchamahabhutas in the drug, diet and therapeutics

Certain inanimate things so combined per chance that animate things arose developing into their final perfection, man. The Panchamahabhutas turned, primarily, into the three biological forms termed as the three Doshas in the body. The primary qualities and functions of these Mahabhutas in the universe reflect in the main qualities and functions of the three Doshas in the body. The three Doshas are the three generalisations made after a comprehensive and critical study of man in relation to his environment and diet. Thus the components of Vata (Akash+Vayu), Pitta (Tejas) and Kapha (Ap+Prithvi) were known by inference based on observation and logic. It should be remembered that many scattered but identical facts found on keen and critical observation are put together to study the principles operating them and such principles form the basis for generalisations,
which are concise and to be concise, obviously, requires to be precise.

The three Doshas perform certain functions in the body in the normal and abnormal state of health. On the basis of those functions or signs and symptoms, the Doshic Vitiation and its nature (increase or decrease) can be easily understood. Then the drug or diet is selected for use on the principles of similarity and dis-similarity. Here arises a pertinent question how should one infer the predominant Panchabhautika constituents of a drug or diet? To solve this problem, the taste has been fixed as the yard-stick for inferring the predominant Panchabhautika constituents of a drug. The taste of a drug is to be perceived with the tongue. Each Rasa indicates the preponderance of the two Mahabhutas, which has been decided by the ancient sages on certain principles of basic sciences. It is on the basis of similarity in the preponderant Mahabhutas in the drug or diet on the one hand and the Doshas on the other, that the drug and diet are selected and used.

**RASA**

**Biological origin and Physiological harmony**

Millions of years ago, near a volcano, some elements so combined together per chance as to form the three nucleotides, which caused a living micro-organism and, thus, life started. The Panchamahabhutas so combined in their order of evolution that the three Rasas (substances having those Rasas) were produced to give rise to the three Doshas and, thus, the first living organism arose. Let us call it the first cycle of the origin of the Rasas. Akasha+Vayu caused Tikta Rasa giving rise to Vata Dosha; Vayu+Tejas caused Katu Rasa giving rise to Pitta Dosha and Tejas+Ap caused Lavana Rasa giving rise to Kapha Dosha. Life started. But the cell wall of the micro-organism was fragile as the Kapha constructing the cell wall was semi-liquid (Lavana produces semi-liquid Kapha). The cell wall needed support to survive and thrive. Therefore, the fourth nucleotide arose in the form of Madhura Rasa caused by Ap+Prithvi. Madhura Rasa caused relatively solid Kapha and supported the cell wall. These four Rasas or nucleotides started life in a micro-organism.
Then, in order to grow and develop, the cell required a self-organising system and, therefore, the *Mahabhuta*, which offered stability to the cell wall and which is relatively the grosser element (*Prithvi*) forming the mass of the cell body, established a link with the other *Mahabhutas* and the second cycle of *Rasa*, started. *Prithvi* could not combine with the most subtle element—*Akasha*, as *Akasha* was all prevailing and devoid of atomic affinity. *Prithvi*, then, combined with *Vayu* and caused *Kashaya Rasa*, which gave rise to *Vata*, *Prithvi*+*Tejas* caused *Amla Rasa* giving rise to *Pitta* and *Prithvi*+*Ap* caused *Madhura Rasa* giving rise to *Kapha*. These cycles can be diagrammatically shown as follows:

<table>
<thead>
<tr>
<th>Formation of Dosha</th>
<th>II cycle of Rasa</th>
<th>In the order of evolution</th>
<th>I cycle of Rasa</th>
<th>Formation of Doshas</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Vata</em></td>
<td><em>Kashya</em></td>
<td><em>Vayu</em></td>
<td><em>Tikta</em></td>
<td><em>Vata</em></td>
</tr>
<tr>
<td><em>Pitta</em></td>
<td><em>Amla</em></td>
<td><em>Tejas</em></td>
<td><em>Katu</em></td>
<td><em>Pitta</em></td>
</tr>
<tr>
<td><em>Kapha</em></td>
<td><em>Madhura</em></td>
<td><em>Ap</em></td>
<td><em>Lavana</em></td>
<td><em>Kapha</em></td>
</tr>
</tbody>
</table>

The growth development on the line of self-organisation is possible only when there is production and preservation of the required substances in the body. It is clear from the above chart that the *Rasas* of the I cycle serve as supportive and preservative agents to the *Rasas* of the II cycle. Even today, the practice of preserving the substances possessing the *Rasas* of the second cycle with the *Rasas* of the I cycle is prevalent. The *Madhura* substances is preserved by adding some *Lavana Rasa* to it. So also, *Amla* can be preserved by *Katu* and *Kashaya* can be preserved by *Tikta*.

It is interesting to note here that the sequences of *Peelu-paka* and *Pitharapaka* bear testimony to the aforesaid second cycle of *Rasas*. Any substance of drug or diet (of *Madhura Rasa*) is of *Kashaya Rasa* in infancy; of *Amla Rasa* when it is grown up but is not yet mature or ripe and of *Madhura Rasa* when fully grown up or ripe. This process stands in conformity with the order of evolution. If the same substance is left to decay or degenerate, the reversible order (of *Pralaya*) will
be seen; the Madhura Rasa recedes to Amla Rasa and, then, Amla Rasa turns into Kashaya Rasa before the substance decays.

Even at the bio-chemical level, only Madhura Rasa fulfils the nutritional requirements (anabolism) of the cells of the body. During exercise (katabolism), Madhura turns into Amla releasing the potential energy into the kinetic energy to perform certain functions (Kriya vyapara) and when this Amla recedes to Kashaya, fatigue sets in due to the disturbance of Vayu.

The six Rasas and the three Doshas were, thus, formed in such a manner as to engender congenial conditions for the living cells to grow and develop in a self-organising system. But the self-organising system warranted the self-controlling system too, implying, thereby, the power of selection and transformation of substances as per the requirements. Thus, the Pitta or Tejas element, endowed with the power of selection and transformation, establishes its link with Kapha and Vata at the level of Rasas in physiological conditions and this is why the three Rasas, on the basis of the total or partial similarity in the Panchabhautika constituents, go to increase a particular Dosha and the remaining three to decrease it. This will be clear from the following chart:

| Madhura  | Increase Madhura — Prithvi + Ap | (Prithvi + |
| Amla     | Amla — Tejas + Prithvi          | Kapha |
|          | Increase Pitta                  |      |
| Katu     | Lavana — Ap + Tejas            | (Prithvi + |
| Tikta    | Increase Amla — Prithvi + Tejas| Tejas |
| Kashaya  | Vata Katu — Vayu + Tejas       | Pitta |
|          | Kashaya — Prithvi + Vayu       | (Akash + |
|          | Tikta — Akash + Vayu           | Vayu) |
|          |                                  | Vata |

**Decreased by Doshas**

| Madhura, Amla, Lavana — Vata — Katu, Tikta, Kashaya |
| Madhura, Tikta, Kashaya — Pitta — Lavana, Amla, Katu |
| Katu, Tikta, Kashaya — Kapha — Madhura, Amla, Lavana. |
From the above charts, it is clear that the six Rasas are so related to the three Doshas in the body that the complex mechanism of the body may go in a self-organising and self-controlling manner. But, then, the drug or diet cannot go into the systems as such. It has to pass through the digestive and metabolic processes and this aspect is dealt with under Vipaka.

Vipaka

The six Rasas are to be digested, assimilated and metabolised before they show their final actions in the body. When the drug or diet is ingested, it is acted upon by the Pachakagni in the G.I. Tract. During digestion, the drug or diets is first disintegrated and then resynthesised as per the specific affinity of the Panchamahabhutas. This process, as also the products thus formed at the end of digestion, is spoken of as Vipaka. The transformation so takes place as to form Kapha, Pitta and Vata in their respective locations in the G.I. Tract. As a result of the breakdown and resynthesis of the six Rasas during digestion, the following three Vipakas emerge, viz.,

G. | Amashya — | Madhura Madhura Rasa — Prithvi + Ap | Kapha
I. | Grahani — | Vipaka Lavana Rasa — Tejas + Ap
    |         | Amla Amla Rasa — Tejas + Prithvi
Tract. | Pakwas— | Katu Katu Rasa — Tejas + Vayu
      | haya    | Tikta Rasa — Akash + Vayu
      |         | Vipaka Kashaya Rasa — Prithvi + Vayu

Pitta digests the drug or diet due to its’ Ushna guna and requires Ushna medium in the place of Kaphas and Vata. It is clear from the above chart that the Lavana Rasa and Katu Rasa liberate their Tejas constituent, firstly, for creating an Ushna medium in the places of Kapha and Vata, respectively, so as to facilitate digestion by the centrally situated Pitta and, secondly, to generate heat, which is utilised in the further biochemical reactions there.

It should also be noted here that whenever we eat Madhura Rasa substances, we reflexly desire to eat Lavana Rasa
also. This is because of the fact that Madhura can be easily digested if Lavana is taken with it. So also, when we eat Tikta and Kashaya Rasa, we wish to eat Katu Rasa also so that the former two Rasas may be easily and properly digested. The principle of Ushna medium is involved herein.

Even though, the breakdown of the six Rasas and their resynthesis into three Vipakas during the digestive process are expressed in the terminology of Rasa, their determination, unlike the Rasas, is not possible by gestatory perception. Therefore, Vipakas are to be determined by their actions. Vipaka is a broad term comprehending the digestion and metabolism. The Pachakagni, Bhautikagnis and Dhatwagnis lodged in the Koshas, Srotamsi and Dhatus, respectively, perform the digestive and metabolic reactions in the body. It is with this view that the sphere of Vipaka extends from the gastrointestinal tract to the cells of the body. Obviously, the substances ingested go on changing or altering their atomic or molecular arrangements during digestion intermediary metabolism and metabolism followed by the change in their concomitant properties and actions accordingly. The main properties and actions of the three Vipakas are as follows:—

<table>
<thead>
<tr>
<th>Rasas</th>
<th>Vipakas</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madhura</td>
<td>Madhura</td>
<td>1. Promotes Kapha</td>
</tr>
<tr>
<td>Lavana</td>
<td></td>
<td>2. Smoothly eliminates faeces and urine</td>
</tr>
<tr>
<td>Amla</td>
<td>Amla</td>
<td>3. Increases semen (all the Dhatus)</td>
</tr>
<tr>
<td>Katu</td>
<td>Katu</td>
<td>1. Promotes Pitta</td>
</tr>
<tr>
<td>Tikta</td>
<td></td>
<td>2. Smoothly eliminates faeces and urine</td>
</tr>
<tr>
<td>Kashaya</td>
<td></td>
<td>3. Diminishes semen</td>
</tr>
</tbody>
</table>

From the important actions of Vipakas (vide supra), it is clear that these actions are also ascribed to those Rasas, which merge to emerge as that Vipaka. It should also be noted that Madhura and Amla Vipakas are common in the second action
while Amla and Katu are common in the third action as shown above. Obviously, therefore, the Snigdha property, common to Madhura and Amla Vipaka, plays its role in Kostha while the Laghu property, common to Amla and Katu Vipaka, plays its role at the level of the Dhatus. Thus, the substance goes on changing at different places of different Agnis and so also change its properties and actions at different places. This aspect is dealt with under 'Gunas'.

-Gunas (Properties)

The term 'Guna' means quality, mode and property. The Gunas inhere inseparably in Dravya. There are 41 Gunas described in the text. Out of these, 20 Gunas, in 10 pairs, are physicopharmacological. Out of these twenty, 8 Gunas survive during digestion and metabolism and these 8 properties only have also been recognised as 8 potencies of drug or diet.

The Panchamahabhutas, like atoms, do not occur in a pure state in nature. These occur in compounds and this is why all the substances of drug or diet are Panchabhautika. The Mahabhutas are the causative factors of the resultant substance and the properties that exist in the causative factors are seen to manifest in the resultant substance. Moreover, the specific manner and mode of the combination of the five elements also give rise to certain qualities in Dravya. Rasa is the best example of it.

The Rasas denote the specific arrangement of the atoms of the five elements with their specific affinity. When a substance comes in contact with the tongue, a motion starts in the atoms of the substance because of the process of Samyoga (synthesis) and Vibhaga (breakdown) initiated by the saliva and it is on account of this motion of atoms or molecules on different wave lengths that the tongue perceives different tastes. The wave length in this regard has been expressed in terms of Mridu and Teekshna properties. During Vipaka, the six Rasas are transformed into three Vipakas in the Koshta. There sets in the process of breaking down of complex substances into simpler ones to be again resynthesised into complex molecules at the level of cells. The properties that emerge in Koshta during Vipaka are Snigdha and Ruksha, which perform
their actions of forming the *Doshas* and causing smooth or difficult elimination of faeces and urine. (See the actions of *Vipaka* in the chart above). The substance, then, is absorbed in the systems where it is acted upon by the *Bhautikagnies* and the properties that manifest there are *Sheeta* and *Ushna*. Then the substance is acted upon by the *Dhatwagnis* when it reaches there and the properties that manifest at the cellular level are *guru* and *laghu*, increasing or decreasing the *Dhatu*, as the case may be.

Thus, the 8 important gunas manifest at different levels and different places. The following table will make it clear:

<table>
<thead>
<tr>
<th>Vipaka</th>
<th>Rasa</th>
<th>Gunas</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Madhura</em></td>
<td><em>Madhura</em></td>
<td>— Snigdha — Sheeta — Guru</td>
</tr>
<tr>
<td><em>Lavana</em></td>
<td>— Snigdha — Ushna — Guru</td>
<td></td>
</tr>
<tr>
<td><em>Amla</em></td>
<td>— Snigdha — Ushna — Laghu</td>
<td></td>
</tr>
<tr>
<td><em>Katu</em></td>
<td>— Ruksha — Ushna — Laghu</td>
<td></td>
</tr>
<tr>
<td><em>Tikta</em></td>
<td>— Ruksha — Sheeta — Laghu</td>
<td></td>
</tr>
<tr>
<td><em>Kashaya</em></td>
<td>— Ruksha — Sheeta — Guru</td>
<td></td>
</tr>
<tr>
<td>Drug or diet</td>
<td>Kosthagni Bhautikagni Dhatwagnis (Doshas) (Srotamsi) (Dhatus)</td>
<td></td>
</tr>
</tbody>
</table>

Now, it becomes clear that *Mridu-Teekshna Snigdha-Ruksha, Sheeta-Ushna* and *Guru-Laghu* are the eight *Gunas* which are of physiopharmacological significance.

**Veerya**

*Veerya* is the potency of a drug. It is on account of *Veerya* that the drug acts. Since the drug acts by virtue of the afore-said 8 *Gunas*, *Veerya* has been said to be of 8 kinds. This is in view of the total actions of drugs. But if the disease is made the central point, the *Mandagni* and the decrease or increase of the *Dosha* and *Dushya* demand attention. The cardinal symptoms of any disease relate to any of the four types of *Srotodusti*. Therefore, some scholars, divide *Veerya* into two types; *Ushna* and *Sheeta*. *Sheeta* represents the potential energy while *Ushna* represents the kinetic energy.

**Therapeutic Significance of Veerya**

Out of the 8 types of *Veerya*, the *Mridu* and *Teekshna* are
limited to the preception of taste by the tongue. The rest 6 are responsible for the therapeutic action in line with the six principles of treatment.

**Six principles of Treatment**

1. Snehana \( \rightarrow \) Dosha \( \rightarrow \) Veerya  
2. Rukshana \( \rightarrow \) Snigdha \( \rightarrow \) Ruksha  
3. Stambhana \( \rightarrow \) Srotamsi \( \rightarrow \) Sheeta  
4. Swedana \( \rightarrow \) Ushna  
5. Brimhana \( \rightarrow \) Guru  
6. Langhana \( \rightarrow \) Laghu

Moreover, the dislodging of *Samprapti* has been said to be the rationale of treatment. The drug is said to act *Rasa-Guna* etc. The following is the relationship between the *Samprapti* and drug potency.

**Samprapti** | **Rasapanchaka** | **Veerya**
---|---|---
Chaya | — Rasa | Snigdha
Prakopa | — Vipaka | Ruksha
Prasara | — Guna | Guru
(Sthanasaamsraya Vyakti) | — Veerya | Laghu
(Srotas and) Dhatu | (Dhatus and) Srotamsi | Ushna
Veerya | Sheeta

In the ultimate analysis, the increase or decrease of the *Doshas* and *Dushyas* is called disease. The causes increasing them abnormally are called *Santarpana Karama* and the causes decreasing them are called *Apatarpaka karama*. The treatment increasing the decreased *Dosha* or *Dushya* is santarpana and the treatment decreasing the increased *Dosha* and *Dushya* is *Apatarpana*. The aforesaid six types of therapeutic measures fall under these two groups as follows:

**Santarpaka Upakramas (Treatment)** | **Apatarpaka Treatment**
---|---
1. Snehana | 1. Rukshana
2. Stambhana | 2. Swedana
3. Brimhana | 3. Langhana

The three measures under the *Santarpaka Upakrama* invariably involve *Sheeta guna* while the three under *Apatarpaka Upakrama* invariable involve *Ushna guna*. It is with this view...
that Sheeta and Ushna has been preferred to be the two kinds of Veerya.

As six Rasas transform into the three Vipakas, the 20 Sharira gunas survive into 8, which, in the ultimate analysis, are merged into 2 types of Veerya.

These are the general principles of drug-action. There are many and varied exception of these general rules which have been worked out and described in the texts.

Prabhava

Where there exists a similarity in taste, potency and post-digestive changes, and yet a difference in action is observed, such special difference in action is called the specific action of the substance (Prabhava),

For example, white-flowered lead wort is pungent in taste and in post-digestive effect, and hot in potency. Red physic nut is similar in all these respects and yet, by reason of its specific action, it acts as a purgative while white-flowered lead wort does not. The principles of Prabhava resembles that of Isomeric substances of isomerids.

To recapitulate what has been described uptil now, it can be said that the actions of drugs are understood by Rasa and Vipaka at the biochemical level and Guna and Veerya at the therapeutic level. What Vipaka is to Rasa, Veerya is to Guna. Obviously, the therapeutic actions rest on biochemical changes and, in the same tune, the Guna and Veerya rest on Rasa and Vipaka. As the drug undergoes certain changes during digestion and metabolism, it’s properties and actions also change. The disease involves Dosa-Dusya-Srotamsi and, therefore, the actions of the drug are explained on them by three pairs of properties; Snigdha-Guru-Sheeta to increase them and Ruksha-Laghu-Ushna to decrease them. These six Gunas form the six measures of treatment (six Upakramas). In the ultimate analysis, the locking up of energy (potential energy or anabolism) and liberation of energy (kinetic energy) are the two factors (Sawarpana and Apatarpana), the Veerya or potency of drug has been said to be Sheeta or Ushna.
Pharmacodynamics in Ayurveda is based on the fundamental doctrines of Panchamahabhuta and tridosha which govern the Physico-chemical and biological phenomena respectively. Ayurveda, accepting the law of uniformity of nature (Loka-Purusha Samya) holds, that drugs and living bodies are similar in composition and as such drugs influence the body by altering the proportion of factors in composition. On the biological plane, they show various activities by exercising their effect on Tridosha e.g. Vata, Pitta and Kapha which are the factors responsible for motion, combustion and growth respectively.

All the materials in nature including the human body as well as drugs are composed of five Mahabhutas—Prithivi, Jala, Tejas, Vayu and Akasha. In drug composition these Mahabhutas are known by inference on the basis of their properties inherent in the drug on which the pharmacodynamics depends.

Drugs have been divided into five groups according to the predominance of one or the other Mahabhutas. The specific characters of these groups are as follows:

<table>
<thead>
<tr>
<th>Properties</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parthiva—Solid and heavy</td>
<td>Solidifying and weight promoting.</td>
</tr>
<tr>
<td>Jaliya—Liquid and cool</td>
<td>Watering and cooling.</td>
</tr>
<tr>
<td>Tejas—a Hot and sharp</td>
<td>Digestive and energy giving.</td>
</tr>
<tr>
<td>Vayavya—Rough and moving</td>
<td>Roughening and causing movement.</td>
</tr>
<tr>
<td>Akashiya—Light and spacious</td>
<td>Weight-reducing and channel-clearing.</td>
</tr>
</tbody>
</table>
In relation to Pharmacodynamics, the properties of drugs have been described in the following terms:—Rasa, Vipaka, Guna, Virya and Prabhava.

Out of these, Rasa (taste) is the only property which can be perceived by a sense organ and as such has been given due importance. Rasa acts as an indicator of the Physicochemical composition of the drug and thereby its effect on the body. Six Rasas (Madhura, Amla, Lavana, Katu, Tikta and Kashaya) represent six different combinations of Mahabhutas and their resultant activity. For example, Madhura Rasa is produced by the combination of Prithivi and Jala Mahabhutas and therefore it increases Parthiva and Jaliya components of the body and decreases the opposite components e.g. those having Vayu and Tejas Mahabhutas. Thus on the level of Dosas, it will increase Kapha and will decrease Pitta and Vata. On the other side, Katu Rasa has got Vayu and Tejas Mahabhutas and thus increases Vata and Pitta dosas and decreases Kapha. From the point of view of chemistry, a very crude analysis of Rasas may be done in this way:—

1. Madhura — Sugar, fat and Amino acids.
3. Lavana — Salts.
4. Katu — Essential oils, Phenols etc.
5. Tikta — Certain alkaloids and glycosides.

The Bhautika composition of Rasas and their effect on Dosas is given in Tables I and II.

| Table I |
|---------|---------------------------------------------------------------|
| Rasa    | Bhautika composition                                          |
| 1. Madhura (M) | Prithivi + Jala (P + J)                                   |
| 2. Amla (A)     | Prithivi + Tejas (P + T)                                   |
| 3. Lavana (L)   | Jala + Tejas (J + T)                                       |
| 4. Katu (Kt.)   | Vayu + Tejas (V + T)                                       |
| 5. Tikta (T)    | Vayu + Akasha (V + A)                                      |
| 6. Kashaya (Ks.) | Vayu + Prithivi (V + P)                                     |
Table II

Decreasing Doshas

<table>
<thead>
<tr>
<th>V</th>
<th>M</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>A</td>
<td>L</td>
</tr>
<tr>
<td>K</td>
<td>T</td>
<td>K S.</td>
</tr>
</tbody>
</table>

Increasing Doshas

From this table it is evident that K and V stand on the extremes on opposite side, while P occupies the middle position all through.

Rasas may be grouped according to specific Mahabhutas which assign to them specific pharmacodynamic characters. For instance, taking Tejas as a criteria, Rasas may be grouped into two—one having Tejas and the other without. Katu, Amla and Lavana come in the agneya group while Madhura, Tikta and Kashaya in the non-agneya (Saumya) group. Similarly, from the point of view of Vayu, Katu, Tikta and Kashaya may be termed as Vayavya Rasas while the remaining three (Madhura, Amla and Lavana) are non-vayavya. This has a direct bearing on Pharmacodynamics because the Rasas having Tejas will increase Pitta while the opposite group will pacify it. Similarly the Vayavya Rasas will increase Vata while the other group will decrease it.

Vipaka is the state of drug under biotransformation. During process of digestion, some transformation takes place in the Bhautika composition of the drug which is responsible for its final action on tissues. Vipaka has been grouped into two—Guru (Anabolic) and Laghu (Katabolic but Charaka has grouped it into three—Madhura, Amla and Katu according to the three doshas. Madhura comes under the anabolic groups, while Amla and Katu come under the Katabolic one.
Again, Amla and Katu may be differentiated by their action on Malas. Amla is laxative while Katu is constipative (Table III).

**Table III**

<table>
<thead>
<tr>
<th>Guru (Anabolic)</th>
<th>Laghu (Katabolic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madhura</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amla</td>
</tr>
<tr>
<td></td>
<td>(Laxative)</td>
</tr>
<tr>
<td></td>
<td>Katu</td>
</tr>
<tr>
<td></td>
<td>(Constipative)</td>
</tr>
</tbody>
</table>

Instead of Dhatuš, we may start from Malas and the Vipakas may be classified as follows:—

Gunas commonly known as Guvādi Gunas are the Physicopharmacological properties of drugs which are important instruments of drug action. They are termed as such because they produce similar properties in the body. For example, Guru is the property of weight and when administered it will add weight to the body. On the contrary, its opposite property Laghu will reduce weight. Thus, these twenty gunas have been grouped into ten pairs having properties opposite to each other (Table IV).

**Table IV**

<table>
<thead>
<tr>
<th>Gunas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A. Guru (Heavy)</td>
</tr>
<tr>
<td>2. A. Shiha (Cold)</td>
</tr>
<tr>
<td>3. A. Snigdha (Oleous)</td>
</tr>
<tr>
<td>4. A. Manda (Dull)</td>
</tr>
<tr>
<td>5. A. Vishad (Non-slimy)</td>
</tr>
<tr>
<td>6. A. Slakshna (Smooth)</td>
</tr>
<tr>
<td>7. A. Mrdu (Soft)</td>
</tr>
<tr>
<td>8. A. Sthula (Gross)</td>
</tr>
<tr>
<td>9. A. Sandra (Solid)</td>
</tr>
<tr>
<td>10. A. Sthira (Stable)</td>
</tr>
</tbody>
</table>

Gunas can’t be isolated from drugs in their abstract form and as such are always applied in terms of drugs. In this way they again become adjectives of drugs such as we commonly say Guru Dravya, Laghu Dravya and so on.
Veerya is the potency of a drug responsible for drug action. A drug devoid of Veerya will be inactive. A particular part of the plant becomes active because of Veerya. Similarly, a drug may lose its veerya after the period of potency. Technically, potent ones among the Gurvadi Gunas comes under the category of Veerya. In other words, the difference between Guna and Veerya is only of potency. Potent Gunas are called Veerya otherwise they are Gunas. Accordingly, the number of Veerya varies as ten, eight, six and two. Practically two Veeryas, Shita and Ushna, are recognised as two broad Categories of potency. For six therapeutic actions, six Veerya have been recognised (Table V).

**Table V**

<table>
<thead>
<tr>
<th>Veerya</th>
<th>Veerya</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Brmhana</td>
<td>Guru</td>
</tr>
<tr>
<td>(Weight-promoting)</td>
<td></td>
</tr>
<tr>
<td>2. Lamghana</td>
<td>Laghu</td>
</tr>
<tr>
<td>(Weight-reducing)</td>
<td></td>
</tr>
<tr>
<td>3. Stambhana</td>
<td>Shita</td>
</tr>
<tr>
<td>(Cooling)</td>
<td></td>
</tr>
<tr>
<td>4. Swedana</td>
<td>Ushna</td>
</tr>
<tr>
<td>(Heating)</td>
<td></td>
</tr>
<tr>
<td>5. Snehana</td>
<td>Snigdha</td>
</tr>
<tr>
<td>(Oleating)</td>
<td></td>
</tr>
<tr>
<td>7. Rukshana</td>
<td>Ruksha</td>
</tr>
<tr>
<td>(Non-oleating)</td>
<td></td>
</tr>
</tbody>
</table>

A particular composition of a drug responsible for a specific action is called Prabhava. For example the cardiotonic activity of Arjuna (Terminalia arjuna), antileprotic action of Khadira (Acacia catachu) etc., come under this category. Although there may be a number of drugs similar to Arjuna in Rasa, Guna, Veerya and Vipaka, the cardiotonic effect of Arjuna is specific to its natural composition not found in other drugs. The activities of emetics, purgatives, narcotics, ant, poisons, intellect promoting drugs etc. are said to be due to Prabhava.

Action has been defined as that responsible for conjunction (Samyoga) and disjunction (Vibhaga) and which is a response of the living to the drug.

Drugs act by Gunas or specific active fractions or by both. Drugs acting against particular diseases are effective due to specific constituents.
Though, as a general rule, Rasa is superseded by Vipaka, Vipaka by Veerya and Veerya by Prabhava, all these properties contribute collectively to drug action. Such as in the effect of Guduci, its Tikta rasa, Madhura Vipaka, Ushna Veerya all contribute by their respective action.

The theory of drug action is based on the law of similarity and dissimilarity (Samanya and Vishesha). For example, the drugs preponderant in Prithivi and Jala Mahabhutas would naturally be attracted to the similar tissues in the body and get fitted there making an addition to them. It is similar to the lock and key action.

Actions of drugs have been carefully observed and classified by the ancient authors. Charaka has defined with concrete examples fifty actions which may be further classified system-wise such action related to G.I.T., Cardiovascular, Reproductive Pulmonary, Nervous, Urinary systems, general Metabolism etc.

In conclusion, Pharmacodynamics in Ayurveda is based on scientific lines and in this respect one has to consider the following points which may be termed as seven Padarthas of Dravya Guna.

1. Dravya (Drug)
2. Guna (Property)
3. Rasa (Taste)
4. Vipaka (Metabolic property)
5. Veerya (Potency)
6. Prabhava (Specific composition)

A drug is said to be the substratum of properties and actions.
The word *Pharmacopoeia* has its origin in the Greek words: *Pharmakon*—a drug, and *Poicein*—to make. The book that gave the list of drugs together with information as to how to make them, procure them or present them came to be called the Pharmacopoeia. Incidentally, the Pharmacopoeia also gave certain other information about the drugs which was useful for the pharmacist in order to recognise the drug and test its purity and present it in a form suitable for the required dose. Each important country in the world has its own pharmacopoeia though the British Pharmacopoeia and the U.S. Pharmacopoeia are more well known and more widely used. In India till as recently as 1946, the B.P. was the official Pharmacopoeia when the first I.P. list was published. The Indian Pharmacopoeia Committee was appointed in 1948, which published the Pharmacopoeia of India in 1955 of which the Second Edition has been published in 1970, while the third Edition is still awaited. Earlier, several publications were brought out which gave copious information on the subject. Some of these worth mentioning are the Indian Materia Medica, by Dr. K.M. Nadkarni (1908), the Pharmacopoeia Indica by Dr. Kartik Chandra Bose (1932) and several others in Indian languages.

So far as the classical Ayurvedic literature is concerned, it may be borne in mind that starting with the post-vedic period of Charaka, Sushruta and Vagbhhatta i.e. from 2,000 B.C to the more recent authors upto 1,000 A.D. There were mostly treatises on Ayurvedic medicine, where all the knowledge on the subject that the author possessed was to be found. Some contained more of the philosophy of Ayurveda, some more of diagnosis while some others were about treat-
ment in minute details together with the knowledge of pharmaceutics and Ayurvedic pharmacology.

After this era of Brihat Treyi (Charaka, Sushruta and Vagbhata) and perhaps the Laghu Treyi (Madhav, Nidan, Sarangdhar and Bhava—Prakash) came several schools of Ayurvedic learning headed by different scholars, who compiled all the then available information about the drugs and their use in the treatment and they have been known as Nighantu Granthas or books of Pharmacopoeias, such as Madanpal Nighantu. Raj Nighantu, Shaligram Nighantu etc., a detailed list of such works numbering to over 70. Ayurvedic Pharmacopoeias in common use and following has been listed in Appendix "A".

In the well known treatises of Nighantus there has not been a systematic effort to give single drugs, compound drugs and formulations separately. In fact some authors have given together the single and compound drugs and formulations in therapeutic actionwise and diseasewise classifications, so as to suit the physician. While doing so, the general and special methods of preparation have been described. A casual survey of some of the books of Nighantus would reveal that there have been some 800 single drugs, some 200 compounded medicines with a large multiple of their number of recipes or formulations, if we make allowance for the variation in the mode of preparation. For example, in the case of the preparation of Tamra-Bhasma, one author has prescribed as many as 6 methods of Sodhan, 6 methods of Maran and 3 methods of Amrutikarana resulting in, ultimately 108 permutations of the Bhasma. Similarly, in the case of Raupya Bhasma there would be 21 combinations.

Now it is these single and compound medicines that go into the making of the different recipes of the Gutikas, Vatikas, etc. and with their permutations and combinations result in manifold number of recipes. It is extremely difficult to ascertain their total number, though it is estimated to be of the order of some 23,000 formulations of these numerous recipes, some 2,000 or so, are in popular practice and hence available for treatment through institutions and pharmacies on large scale. Of the remaining recipes, individual practitioners still hold their immense faith in the specialised process
of preparation of compound medicines in their own pharmacy and use them in the preparation of their formulations to be dispensed to their patients with confidence.

By Ayurvedic single drugs we mean such simple source materials derived from the plant and animal kingdom as also the minerals occurring in their natural conditions. There are some 600 species of plants which supply single source drugs such as root, stem, leaf, flower and fruit, their parts, exudations, or the entire plant as the case may be. The following are illustrations of each.

(i) Root—Ashvagandha, Shatavari.
(ii) Stem—Madhuyashti, Guduchi.
(iii) Leaf—Neem, Vasaka.
(iv) Flower—Palash.
(v) Fruit—Harda, Baheda, Amalaki.
(vi) Entire plant (Punchang)—Kantakari.
(vii) Exudations—Guggulu, Vijaysar.
(viii) Galls—Karkat—Sringi.
(ix) Stamens—Nag-Kesar.
(x) Stigmas—Saffron.
(xi) Seeds—Bavchi, Jaipal.
(xii) Seed Coat—Isabgol.
(xiii) Pulp—Bilva, Gorakhamli.
(xiv) Juice—of whole plant—Bhringiraj, Tulsi.
—of fruit —Lemon, Bijora.

The animal kingdom provides some 60 to 70 single drugs, a few examples would illustrate the variety of products. (1) Entire animal (Mabria, Sp., Earthworm). (2) Feather (Peacock feather). (3) Secretion (Milk, Semen of wild cat, Musk Pearl etc.). (4) Gall-stones (Gorochan). (5) Urine (Cow’s urine). (6) Egg (Hen’s). (7) Cowdung. (8) Ghee. (9) Conch, Coral. (10) Cuttle fish bone (Samudrafena). (11) Blood (Bed-bugs) a comprehensive list of such products has been appended as Appendix ‘B’.

The mineral kingdom rich in elements and chemical compounds provides some 80 to 90 substances which go into innumerable compound drugs and formulations. Minerals like Mercury, Cinnabar, Copper Pyrite, Sulphur are too well
known to stress. However, a few examples would illustrate the role they play.

<table>
<thead>
<tr>
<th>Mercury</th>
<th>Gold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cinnabar</td>
<td>Diamond</td>
</tr>
<tr>
<td>Iron Pyrite</td>
<td>Shilajit</td>
</tr>
<tr>
<td>Copper Pyrite</td>
<td>Hajratber</td>
</tr>
<tr>
<td>Iron Ore</td>
<td></td>
</tr>
</tbody>
</table>

Though these examples are of illustrative nature, while scanning a cross-section of the over 1,000 drugs of vegetable, animal and mineral origin, one does encounter a difficulty in the identification of a small section of drugs known as controversial drugs of which the identity is in question. They are known as controversial drugs, the controversy having crept in because of the vastness of the country and lack of means of easy transport and communications in those days some 1000 years ago where certain species and substances, locally available, were found to have similar therapeutic properties and acceptable to the Ayurvedic medical profession as substitutes and got popularly established by the name of the original drug itself and have now become a matter of controversy. Examples could be cited of drugs like *Rasna, Brahmi, Somavalli, Luxmana, Kakoli* to illustrate this point.

In the ancient Ayurvedic texts, certain drugs have been officially accepted as substitute drugs as they have been found to possess similar therapeutic properties and have been in use as substitutes for centuries together. The following examples would illustrate the point:

- Honey—Old Jaggery
- Iron Pyrite—*Mandur*.
- *Chavya—Pippalimul*.
- *Atisa—Nagarmotha*.
- *Kakoli—Ashwagandha*.

A comprehensive list of common *Pratinidhi Dravyas* has been given in Appendix ‘C’.

In modern times, one has to take into account a certain element of adulteration which, however in restricted to a few costly and unavailable drugs such as Musk, Saffron. Bamboo, Silica deposits etc.
In the Ayurvedic Pharmacopoeia, medicines are presented in several forms according to the kind and availability of the drug and the type of the disease. Some drugs are collected fresh and immediately administered raw, whereas certain others are collected in their proper season, dried in the shade and kept for treatment; yet others are subjected to several pharmaceutical operations and made into compound preparations and formulations and preserved for definite periods. There are however certain preparations, mostly of mineral origin which undergo elaborate treatments with drugs from the plant and the animal kingdom and are subjected to trituration and heating; these can be preserved for an indefinite period without losing their potency or therapeutic properties. Some of the forms of presentation of Ayurvedic medicines given below would illustrate the above statement:

Fresh Juice (Swaras)

Fresh drug material in the form of green leaves, stems, five parts (Panchang), fruit as the case may be is macerated and the macerated lump pressed to yield the fresh juice. In case of fruits, the juicy contents are expressed by simple pressure. The juice is either used as a fresh drug to be administered or used as a processing agent for trituration, wherein it comes into intimate contact and forms a complex with the material triturated during which process, it is claimed that consequential transfer of its therapeutic properties results.

Pulp (Kalka)

Fresh cleaned drug material consisting of green leaves, stems, five parts (Panchang) or fruit is macerated to a fine uniform pulp which is directly administered or used for external treatment and also as an ingredient in the processing of drugs. If the pulp is made out of dry powdered material, it is termed as Prakashpaa or Avapa.

Powders (Churna)

Churna is the fine powder of a single drug or a mixture of more than one drugs in a dry form, which can retain its
potency for a specified period of about six months according to the constituents and seasonal climatic conditions. Coarse powders of vegetable drugs are intended for preparing decoctions while medium ones for incorporation in pills and tablets, whereas still finer one are used for oral or external treatments while the Bhasmas and Pishitis are preserved in superfine powder form. In order to preserve the potency of the powders, they are made into Pills called Guitka, Guti, Vatika, Vati and Vataka using a binding agent like sugar, Guggalu etc.

Decoction (Kashaya)

Kashayam is the decoction obtained by soaking coarse powder of one or more drugs in four times the weight of the woody material and boiling it to ¼th volume and separating the watery extract. The proportion of water is increased for hard and woody material. The decoction is administered direct to the patient or used in the process of manufacture of other Ayurvedic medicines.

Extraction done without boiling in lukewarm or cold water is also known as Fant and Hima.

Oils and Ointments: (Taila and Abhyanjana or Malham)

Several oils like the Neem oil, Karanj oil, Sandal Wood Oil, Mustard Oil, Castor Oil, Chaulomogra Oil, Bhilama Oil, which have their own pronounced therapeutic properties are expressed or extracted and used. On the other hand there are several therapeutic agents naturally occurring in certain drugs, which are oil or fat soluble and are extracted on an oil or fat base or presented as such for efficiency. The common bases used are Sesame Oil, Mustard Oil, Coconut Oil, Ghee, animal fat from different animals, Bee’s Wax. These are some of the common vehicles prescribed for preparation of oils and ointments. The proportions and choice varies according to the medicine intended.

Medicines preserved and presented in Alcoholic Media (Asavas and Arishtas).

The decoction has been the earliest mode of presenting
and administering medicines. But it had its limitations in as much as the availability of the ingredients in potent form all round the year. Secondly, some of the ingredients in a powder (Churna) were found to be less soluable or insoluble in a watery medium. Hence it was imperative to evolve a medium which could extract all the active drug materials and preserve them in active form for an indefinite period. The mode of extraction of active constituents in a weak alcoholic medium of self generated alcohol, thus became most handy and popular and the medicines thus presented are designated as Asavas and Arishtas. They are both palatable and quick acting.

There are some 150 Asavas and Arishtas mentioned in the Ayurvedic texts of which some 45 are in popular practice.

In both, Asavas and Arishtas, the basic pharmaceutical principle involved is the same viz. to extract the active drug ingredients from the drug source (root, stem, leaf etc.) through a biochemical process of fermentation in a mildly self generated alcoholic medium. This ensures the extraction of both water soluble as also the alcohol soluble constituents enhanced through the agency of a micro-biological organism.

The mildly sweetish alcoholic medium coupled with slightly acidic taste and flavoured with the aroma of the Prakshepa Dravyas makes the Asavas and the Arishtas most acceptable form of presentation not withstanding the fact that in some, the ultimate taste of the Asavas—Arishtas is even bitter due to the drugs that have gone into the solution. Further, due to the presence of alcohol, they are self preserved and are indefinitely therapeutically potent.

Most of the Asavas are named after the principal drug material in the formulation, though there are dozens of other supporting drugs probably calling for a partial synergestic action in addition to the main fermenting substrate consisting of sugar, jaggery, honey, grapes and the like and the aromatics and preservatives like Cinnamon, Cardamom, Tamal Patra, etc.

**Extraction of constituents by distillation (Arka)**

This is a common preparation obtained by subjecting the
extractable drug material to steam distillation and condensing. the steam which carries the volatile material and the condensed material is administered to the patient as Arka.

Saar

Saar is the name given to the solid drug material deposited between the cortical tissue layers which occasionally oozes-out seasonally due to excessive heat or cold. It is also collected by boiling chips of wood in water and concentrating the extractive as in the case of Catechu. Camphor also is a Saar, which is collected by sublimation.

Ksharas

Ksharas are mixtures of salts soluble in water obtained from the ash of individual plants, as in the case of Apamarga Kshara, Punarnava Kshara, Yava Kshara etc. Generally Ksharas are used in the processing of several mineral ayurvedic preparations. However, their individual therapeutic use is pronounced in the treatment of fistula externally and as therapeutic agents for internal administration for other diseases.

Mercury and Mercurial Preparations

Since the time of the alchemists Mercury has been regarded as a very powerful element, not only on account of the therapeutic properties of its compounds, but also because of its liquid form and capacity of going into amalgamation with a number of other metals and itself separating out from the same by treatment with heat. It is on this account that Mercury was described by the term "King of Metals".

Mercury in the olden times was obtained in a mineral form called the Cinnabar and as such, there was a belief that it is contaminated with several impurities and inherent blemishes. With a view to removing these impurities and blemishes, several methods of treatment have been prescribed in the Ayurvedic texts. The processes mainly consists of 8 treatments known as Ashta-Samskaras comprising the following operations: (1) Swedanam (2) Mardanam (3) Murchhanam (4)
Uttaparam (5) Patnam (6) Rodhanam (Bodhanam) (7) Niyamanam (8) Sandeeapanam.

Though there are ten more Samskaras which are intended for alchemy and not for enhancement of the therapeutic properties. In fact, the eight Samaskaras though described to have been intended to remove certain blemishes, are basically processes of purification and potentization of Mercury, wherein the properties of Mercury by the subtle treatments with drug materials and constant trituration are enhanced and are recomended to give higher therapeutic potency to the resultant medicines prepared by using the element.

The simplest preparation of Mercury is Kajjali obtained by triturating the potentized mercury with purified sulphur. Kajjali is a loose complex of mercury and sulphur as well as mercury remain unsaturated and hence available for quick therapeutic action. Kajjali itself is used in several mercurial preparations as a vehicle of therapeutic properties when brought in combination with other drug materials in different forms.

The potentized Mercury is used in large degree for the preparation of what are known as Kupistha Rasayanas which are its compounds with sulphur and other metals, prepared after an elaborate process of treatment and trituration. It is these compounds of therapeutic value that are used in the manufacture of a large number of pharmaceutical preparations popularly known as Khalvi-asa and Kalpa or the triturated preparations of Mercury such a Rasa-Sindoor, Purna-Chandrodaya-Rasa, Samir-Pannag-Rasa, Suvarna-Malini Vasant, Brihat-Vat-Chintamani-Rasa, Anund-Bhairava-Rasa, Suvarna-Soot-Shekhar. Another set of preparation out of mercurial compounds are the Pottali-Kalpas, in which the ingredients are subjected to heat and made into a round mass, which is so potent that it is administered in very small doses by rubbing on a clean stone plate in an adequate vehicle and administering the same to the patients.

The Bhasmas

Bhasmas are the preparations of substances from the minerals as well as from the animal kingdom by subjecting
them to an elaborate process of trituration with various plant and animal material and subjecting them to a repeated heat treatment. During the process of treatment with vegetable and animal products, they form complexes which on treatment with fire undergo transformation into permanent organometallic compounds or the like with enhanced therapeutic properties. Most of the ingredients are reduced to oxides and sulphides of metals and non-metals with such stable complexes which are easily absorbable by the system. The processes of manufacture of Bhasmas are so prolonged and intricate that the treatment in some cases is extended over years together. Invariably all metals before being taken up for preparation of Bhasmas are subjected to the process of purification known as Shodhana, which consists of heating the metal and quenching it in different fluids like oils, buttermilk, cow's urine, Kanji, Kultha decoction and then subjected to the process of Marana, wherein it is treated with specific plant juices, salts, elements like Mercury, Sulphur etc. and subjected to heating in furnace under controlled temperature conditions. The purpose of Marana is to bring a change in its original form and lustre and prepare it for combination with other substances.

The process of manufacture of Bhasmas varies according to the desired therapeutic properties and thus, there are cases where one single Bhasma has 10 to 20 processes of preparations, wherein not only the ingredients vary but also the temperature gradients differ. In some Bhasmas, the processes of Marana is repeated a hundred and thousand time, till it acquires certain physical attributes and special therapeutic properties. Examples may be cited of Tarana Bhasma, which has 20 formulations, whereas Abhrak Bhasma is subjected to Marana treatment repeatedly for as many as a thousand times. Barring these extreme cases, by and large, Bhasmas can be prepared in a reasonable time with desired therapeutic properties according to the standard methods of preparation.

The Ayurvedic Concept of the Action of a Medicine

Ayurveda has its own concept of the material existence of
the body and its physiology, which has to be understood with a view to be able to get an insight into the action of the drugs on the basis of their classification. The body having been built up of the Panch-Maha-Bhutas and the Atma. The structure and functions of its normal development or deterioration depend on the three humours (viz. Vata, Pitta and Kapha), the seven Dhatus (Rasa Rakta, Mansa, Meda, Asthi, Majja and Shukra) and the three Malas (Mutra, Purisha, Sweda etc.). Hence they have been described as the root cause for a normal growth or function of the body.

The Doshas as also the Asthir Dhatus and Malas are supposed to be in constant circulation in the body through their paths of circulation called the Srotas.

According to Ayurveda, excessive indulgence in or denial to an individual of a particular type of diet or regimen and the abnormal seasonal variations bring about the preponderance or deficit of properties (Gunas) of the particular Dosha and abnormally imbalance them resulting in a stage called the Dosha Prakopa. The same holds good in the case of Dhatus too. Further, due to the same reasons, the Srotas also are deranged (srotovaigunyam). However, the derangement of the Srotas may occur independently of the Dosha-Prakopa or as a consequence of the same.

The abnormally imbalanced Doshas affect the Dushyas viz. Dhatus and Malas and a stage called Dosha-Dushya-Sammurchana is set in. Thereafter, the abnormally imbalanced Doshas and Dushyas which are in circulation throughout the body through the different specific or general paths of circulation viz. Srotas find their abode in that part of the body which is physiologically weak or defective on account of local derangement of Srotas and accumulate and subsequently become manifested by a group of symptoms by which we diagnose a disease.

This would indicate that such a treatment will have to be chosen which will counteract the Doshik imbalance and set right the derangement or Dosha-Dushya-Sammurchana. This is borne out by the fact that one of the convenient way in which the Ayurvedic medicines are principally classified is into three main categories:
1. those which counteract the excess of *Kapha* humour (*Kapha-Shamak*),
2. those which counteract the excess of *Pitta* humour (*Pitta-Shamak*),
3. those which counteract the excess of *Vata* humour (*Vata-Shamak*),

While assessing the humoural imbalance, one has to take into account the proportionate or relative excess or deficiency of one or two humours and select an appropriate combination of medicines rather than go by a rule of thumb method. A correct judgement or assessment of the proportionate preponderance or otherwise of one or more humours is the basis of such a large number of formulations existing in the Ayurvedic formularies and pharmacopoeas.

In fact, the inclusion of more than one drug in a recipe is not really accidental but deliberate and purposeful in as much as the correct knowledge of the action of different drugs going into the formulation would give a thorough insight into the desired therapeutic action, so as to counteract the disease condition of the body.

The action of a drug has to be understood on the basis of the theory of *Rasa-Guna-Virya-Vipaka* and *Prabhava* and not merely on its gross pharmacological properties. It would be interesting to study the classical Ayurvedic system of classification of drugs on the basis of some of their attributes which make therapeutic indication easier. Charaka for example classifies the *Kashayas* (Combinations) into 50 groups with 10 examples of each like *Hridya*, *Rasayana*, *Swasahara* etc.

**Ayurvedic Drugs in the Pharmacopoeia of India**

The Indian pharmacopoeia Committee which is entrusted with the job of publication of successive edition of the Indian Pharmacopoeia from time to time with additions and deletions as they occur in the light of newer knowledge of the subject, has its own limitations in the matter of the inclusion of indigenous drugs in the I.P. as, unless some essays and other data of the drug were available, it could not be included in the I.P. It is on this account that we find only 78 drugs
from the Ayurvedic Pharmacopoeia being included in the publication. The number in reality is much smaller, if we take into account that some of the drugs are common between the modern pharmacopoeia and Ayurvedic Pharmacopoeias. A comprehensive list of such drugs of the Ayurvedic Pharmacopoeia, that find a place in I.P. has been given in Appendix ‘D’.

The Ayurvedic Formularies

As has been referred to earlier, the several treatise given in Appendix ‘A’ describe single drugs, compound medicines as also a large number of formulations which vary from one another, either in the number of component drugs or their proportion, so as to suit a particular set of symptoms in a disease. The Government of India in the year 1962 appointed an Ayurvedic Pharmacopoeia Committee under the Chairmanship of Col. Ram Nath Chopra, which was subsequently reconstituted under the Chairmanship of Prof. A.N. Namjoshi in 1973. This Committee was entrusted with the job of compiling an Ayurvedic Formulary and an Ayurvedic Pharmacopoeia. The work of preparing monographs on single Ayurvedic drugs involves considerable laboratory work in ascertaining the species and studying its pharmacognostic characteristics for purposes of identification and detection of adulteration, if any. It also involves a thorough compilation of the properties of the drug according to Ayurvedic terminology and also to ascertain and work out an Assay method for each drug. This necessitates the coordinated efforts of a number of regional plant survey units and chemical laboratories, with a scientific infrastructure to work on different species.

So far as the requirements of the Drugs and Cosmetics Act, 1940 is concerned, unless all this information is produced and verified, it is not possible to find a place for a drug monograph in the Ayurvedic Pharmacopoeia.

It was therefore felt that until sufficient preparatory work for the compilation of the Ayurvedic Pharmacopoeia was in hand, another important work viz. that of compilation of the formulary of Ayurvedic medicines could be taken up. It is
with this consideration that the Ayurvedic Pharmacopoeia Committee decided to collect information for the publication of the first volume of the Ayurvedic Formulary. Out of the thousands of formulations already referred to, the Committee had to make a choice of a few important and popular formulations, which would cover a large sector of the consumer requirements in this field. The Committee therefore collected the Ayurvedic Formularies in the use of the State Hospitals, Ayurvedic Institutions and other Medical Aid Schemes, with a view to ascertain the fastest moving drugs with the largest public demand. Having ascertained the names of medicines based on the above criteria, the Committee applied its mind to the selection of the best recipe or formulation of each type in vogue with maximum potency and reliability of therapeutic properties. This was done by expert physicians sitting together to discuss the merits and demerits of each formulation of the category and selecting the best one according to them. In this manner, some 450 formulations were accepted by the Committee for incorporation in the first volume of the Ayurvedic Formulary now (Feb. 1978) under print. The Formulary has general notices as also the details of procedure to be followed in the preparation of each category of medicines, as also the specific parts of the drug to be made use of in the preparation. All weights and measures have been reduced to the Metric system and dosage, Anupana (vehicle) and important therapeutic uses in Ayurvedic terms have been specified. It is hoped that the above information would enable not only the public institutions but also the commercial Ayurvedic Pharmacies to help in bringing uniformity of preparation throughout the length and breadth of this country. The second volume of the Formulary will include about 500 other formulations, which may not be as fast moving as those in the first volume, but which however, will complete the full spectrum of formulations in common practice at present. The publications of the formulary will in no way prevent a private Ayurvedic practitioner from preparing and prescribing formulations of his own choice at any time.
Standardization of Ayurvedic Drugs

Since the dawn of Aryan civilization Ayurveda has grown as a science in India. Every Ayurvedic physician was a self-sufficient unit in as much as he had an intimate knowledge of the drugs he used and knew the source from where he had to collect them, the season suitable for their collection and the mode of their preservation. He was himself the Pharmacist and had a first-hand knowledge of the processes of manufacture of the several pharmaceutical preparations. He had his own standards ingeniously evolved on the basis of the then prevalent knowledge of chemistry and minutest shades of observation. Over and above, the practical knowledge of the numerous pharmaceutical processes was handed on from the teacher to the student or from the father to the son and further enriched from generation to generation. Thus, whether it was the knowledge of the source of the plant or of the identification of the species or judging the maturity of the drug material or preparing several amazing recipes, the Ayurvedic physician had his old standards to look to and follow rigorously. Since the medicines being prepared for use in his own practice, the use of ingredients of the highest purity was made and since there was no motive as to profitability, there was no room to economise in the material used or the time taken for the completion of the elaborate process.

The word "standard" was not unknown to the Indian physician. Standards existed in practice though not much talked about or codified in books. Over the past 200 years or more the social life in the country has undergone considerable transformations bringing about a new economic order which, coupled with industrialization, resulted in a profound urbanisation. A large number of physicians settled thus in urban areas. Urban living presupposes loss of contract with the rural environment and the forests and hence the means to manufacture their own requirements of medicines. To meet the demand of prepared medicines, a number of commercial Ayurvedic Pharmacies sprang up during the last 100 years or so. They did initially a good job in meeting the needs of the profession in the new economic set-up as most of them were
inspired by a patriotic spirit and dedicated to the service of the masses—in fact some of them were projections of Ayurvedic teaching institutions. However, during the last fifty years or so a number of purely commercial Ayurvedic pharmacies were established a majority of which tried to keep up to the high traditions of using genuine raw materials, to follow the classical method of preparation and to supply potent Ayurvedic medicines to the profession and the public. However, in a controlled commercial field, tough competition is likely to result in certain shortcomings in the quality of material and also in short-circuiting of the processes. To add to this, the permission to use substitute drugs and a little confusion created by some controversial drugs came in handy, and in some quarters substandard quick-processed drugs were flown into the market.

This situation was further aggravated and encouraged by the bureaucratic policy of the government and local bodies of selecting the cheapest tender for the purchase of medicines for public dispensaries and hospitals. In the absence of any pharmacopoeial standards, any choice of a costlier tender would have been regarded as arbitrary and subjective. It was therefore that the competition for cheapness resulted in the use of cheap ingredients and in the practice of short cut processes. It is here therefore, that the need for evolving standards for Ayurvedic drugs and tests for their identification and quantitative estimates was actually felt.

It was in the report of the Chopra Committee (1946) first, where a clear recommendation has been made that "An Ayurvedic Pharmacopoeia by the Central Research Institute be compiled." Thereafter, the Dr. Udupa Committee (1958) in its report made detailed recommendation on the question of standardization of Ayurvedic drugs and suggested the establishment of a Central Drugs Laboratory for Ayurveda (preferably located in Bombay) to undertake the drugs standardization work.

Prior to the appointment of the Dr. Udupa Committee by the centre, the Government of Bombay appointed a Board of Research in Ayurveda in 1951. This Board realised the importance of the work of standardization of Ayurvedic drugs and established an independent section for Standardization of
Ayurvedic drugs and undertook the work of standardization of some 100 Ayurvedic drugs. It also established a research pharmacy to work out detailed processes of preparation of Ayurvedic medicines and the efficacy of the medicines prepared was actually being clinically verified. The Government of Bombay appointed a Committee for Standard Ayurvedic Herbs and Drugs in 1960 called the Vaidya Bapalal Committee. This Committee in its report referred to practically all the aspects pertaining to the standardization of drugs including formulations and took a positive step in incorporating an up-to-date list of most of the popular and commonly used Ayurvedic drugs, clarifying several lingering controversies by personal discussions with regional practitioners of Ayurveda and by examining the samples of drugs actually used by them. This Committee reiterated the demand for the publication of an Ayurvedic Pharmacopoeia and suggested the establishment of a Drug Research, Standardization and Drug Testing Laboratory for Ayurveda.

All the above recommendations of the Central and State Committees, as also the pioneer effort made by the Board of Research in Ayurveda, Bombay and later Maharashtra, and also the contribution made by the Vaidya Bapalal Committee has made the work of standardization of Ayurvedic Drugs itself standardized viz., we are now in a position to say as to what we know and what we do not. We also know how the planning of research in standardization of Ayurvedic drugs has to be made; what are the main topics of major controversy where decisive steps have to be taken; and where extensive experimentation on processing of medicines has to be undertaken. In fact a considerable scientific infra-structure including a Drugs Standardization and Drugs Testing Laboratory will have to go into action if really useful results are to be obtained. Ayurveda is an unfathomable field for research; the drug research and their standardization has a precedence and social significance apart from it being a scientific need.

Until a master plan of research into the Standardization of Ayurvedic Drugs is prepared and work allocated to the different laboratories and institutions all over the country where expertise of the particular speciality assigned is available, this
gigantic task will not be over. Each research centre will have to be liberally-financed so that some tangible and useful results would be achieved in the course of the first five years.

Though the task of evolving absolute standards for Ayurvedic drugs is colossal, it will have to be achieved in phases. The first phase of standardization would be to evolve working standards which would enable the pharmacist to eliminate adulterant, fake and substandard material. This was the course followed by the modern pharmacopoeias of the world during their early stages. While evolving standards for raw materials and prepared-medicines such as Bhasmas etc. the tests prescribed in the Ayurvedic texts would be taken as a starting point. The different assay methods would be so developed as would be based on the Ayurvedic requirements as attributes of the drug. Beyond this, chemical assay methods will have to be evolved such that they would be easily reproducible in a medium type of a laboratory located in an Ayurvedic Pharmacy. After all, all the assays given in the B.P. and the I.P. are not very ingenious and conclusive. The work with regard to Ayurvedic Drugs need therefore be started with no inferiority complex but with a confidence of ultimate success in the results. The finite standards are determined as the initial working standards are actually put to use after repeated trials.

While evolving the working standards for Ayurvedic drugs, physical description, physical tests, pharmacognostic technique, chemical reactions including the arbitrary and empirical reactions would greatly assist in the endeavours for evolving assay methods and working standards. In an example given below the different aspects of an Ayurvedic drug have been analysed according to modern requirements to show how it can be incorporated in a standard pharmacopoeia.

Ajamoda

*Trachyspermum roxburghianum* (DC.) Sprague
*Umbelliferae*

1. Synonyms (*Paryaya*):—

*Bastamoda, Brahmakoshi, Dipyaka, Gandhapatrika, Hastima-
yurika, Hastikaravi, Hrdayagandha, Karavl, Kharashva, Kharahva, Locamarkata, Mayuri, Markati, Moda, Modadhya, Modini, Phalamukhya, Sikhimoda, Ugragandhika, Vahridipika, Barbarmoda.

2. Regional Names (Desiyanaama) :
   Bengali : Randhoni.
   Hindi : Ajmuda, Ajmoda, Ajmod.
   Kannada : Ajmodavoma.
   Malayalam : Koranza.
   Tamil : Ashamtagam.
   Telugu : Ashumodagavoman.

3. Habitat and Occurrence (Uptattisthana) :
   A cultivated annual herb mainly grown in Andhra Pradesh, Gujarat, Madhya Pradesh, Kashmir and Uttar Pradesh. It is generally sown in the month of September and harvested in February.

4. Period of Occurrence (Uptattikala) :
   Sown in the month of September and harvested in February.

5. Description (Vivarana) :
   A multi-branched annual herb upto 90 cms. in height, erect, with fusiform roots, leaves bipinnately divided, ultimate segments of lower leaves rather broad, of upper narrowly linearlanceolate, stem glabrous, flowers terminal or axillary, compound umbels, white or greenish white, small, fruits ovoid, aromatic cremocarps, 1.5—3.0 mm. long, ribbed, yellow to yellowish green when ripe.

6. Parts Used (Grahyamsa) :— Fruits.

7. Procedure and time of collection (Grahanavidhi) :
   Ripe fruits collected by uprooting the plants and threshing on a mat in shade till separated from stalks.

8. Preservation and Storage (Pariraksana) :
   See under general notices.

9. Morphology (Svarupa) :

(a) Macroscopic (Sthula) :

Ajmod fruits occur mainly as entire cremocarps with pedical attached or detached and a bifid styloped, the free ends of which curve along the dorsal sides. A small portion of the drug occurs as the separate mericarps. They are glabrous, ovoid to conical, about 1.5—3.00 mm, long and 1.2—2.8 mm. wide, and are yellow to yellowish green in colour. The separated mericarps are broadly ovoid, more or less curved, dorsal surface convex with five equally distinct longitudinal primary ribs and at the summit curved stylopodium, commissural surface flat, showing darker and light coloured longitudinal bands, the former representing the position of vittae and vascular bundles. Odour aromatic and producing slight numbness to the tongue.

(b) Microscopic (Suksama) :

Mericarps have 4 large vittae on the dorsal surface and 2 on the Commissural surface. Three to five secondary oil canals are present under each primary ridge, and they are present also between the ridges. Carpophore is present on the commissural surface. The cells of the epicarpo have thin striated cuticle and outer walls are drawn into papillate. Ranunculaceous stomata upto 55 micron in diameter are present among these cells. The mesacarp consists of polygonal thickened and lignified cells having oval to round pits. These thickened cells measure 30-52-95 micron in diameter in t. s. and are found mostly around the vascular strands in the region of ridges. Collateral vascular bundles lie beneath the epicarp. The trachiedes are 23-202-388 micron in the length and the xylem parenchyma is lignified, elongated with elliptical pits. They measure 52-118-176×13-30-44 micron. The larger secondary vittae towards endosperm measure upto 123 micron in width and the smaller towards the periphery have the smallest diameter of 184.

The raphe is made up of parenchyma cells surrounding a vascular strand, just outside the centre of the commissural region of the seed coat. The endosperm is of the usual umbelliferous type and its cells measure 22-48-75 micron. n t.s. the embryo lies at the centre of the endosperm.
10. Constituents (*Sankhataka*) :

The fruits yield an essential oil (upto 2.5%) a fixed oil (4.5%) and a crystalline katonic compound (0.1%) formula being \(\text{C}_{13} \text{H}_{12} \text{O}_3\) (m.p. 117-180) and also coumarins (fumarocoumarin corresponding to bergaptan).

11. Identity, Purity, Strength and Assay (*Pramapana, Parikshana*):

(i) Foreign Organic Matter:—Not more than 5.0% (as per method)
(ii) Total Ash: Not more than 14% (as per method given)
(iii) Acid Insoluble Ash: Not more than 4%
(iv) Alcohol Soluble Extractive: Not less than 14% (as per method given)
(v) Water Soluble Extractive: Not less than 2% (as per method given)
(vi) Volatile Oil: Not less than 2% (as per method given)

12. Taste (*Rasa*): *Katu, Tikta*.

13. Properties (*Guna*): *Lagu, Ruksha*.


15. Post Digestive Changes (*Vipaka*): *Katu*


17. Method of Processing (*Upaskara vidhi*): See under general notices.

18. Substitutes (*Pratidhi Dravya*):

(i) *Anium lentophyllum*
(ii) *Anium graveolens Linn*.

19. Important Formulations (*Pradhanayoga*): *Ajmodorka, Ajmodadi Churna, Ajmodadi vataka*.


21. Dose (*Matra*): 3-6 gms of the powder drug.
List of Ayurvedic Texts Including Classical Nighantus
Giving Pharmacopoeial Information

* Abhinav Chintamani
* Arka Prakash
* Arogya Kalpadrum
  Arun Nighantu
* Arya Bhishak
* Ashtang Haridaya
* Ashtang Samgraha
* Ayurved Chintamani
* Ayurved Kalpadrum
* Ayurved Prakash
* Ayurved Ratnakara
* Ayurved Samgraha
* Banga Sen
* Bhaishajya Ratnavali
* Bharat Bhaishajya Ratnakara
* Bhava Prakash

* Bhel Samhita
  Bhojraj Nighantu
* Brihat Nighantu
  Ratnakara
* Chakradatta
* Charaka Samhita
  Dhanvantari Nighantu
  Dravyavali
* Dravya Guna Nighantu
  Dravya Guna Shat Shloki

Gad Nigraha
Gaj Nighantu
Halayudh
Harmekhla
* Siddha Bhaishjaya Manimala

Hridayadip
  Kaiyadev Nighantu
* Kashyap Samhita
* Kupipakya Rasayana
  Madanpal Nighantu
* Nighantu Ratnakara
  Pathyapathya Nighantu
  Raj Martand
  Raj Nighantu
  Raj Vallabha
* Ramamrit
  Ras Candanshu
* Ras Manjari
* Ras Raj Sundar
* Ras Ratna Samuchaya
* Ras Tantra Sara Sidha
  Prayog/Samgraha
* Ras Tarangini
* Ras Yoga Sagar
* Ras Yoga Ratnakara

* Ras Yoga Samgraha
* Rasendra Sar Samgraha
* Ras Pradipika
  Ratnavali
* Sahasra Yoga
  Sarva Roga Chikitsa
  Ratnam
  Shaligram Nighantu
* Sharangdhar Samhita
  Sheshraj Nighantu
  Shodhal Nighantu
* Vaidyaka Sabha Sindhu
Sidha Mantra
Sidha Yoga Samgraha
* Susaut Samhita
* Vaidya Chintamani
* Vaidya Jivan
  Vaidya Manorama
* Vaidyaka Chikitsa Sara

(*) These have been included in the First Schedule to The Drugs and Cosmetics Act, 1946.
APPENDIX B

List of Animal Drugs Used in Ayurvedic Pharmacopoeia

Antigone antigone, Linn. Crane Stork (Eng.)
Ambergris
Bezoar stone
Bile (Eng.)
Bivalve shell of a fish
Blistering fly, Mylabris Chicorrii
Bos taurus Linn, Cow’s urine
Buthus tamulus and Palamnaeus Sps. Scorpion (Eng.)
Butter
Butter Milk
Camelus dremodarius, Linn, Camel (Eng.)
Camponotus compressus, Large black ant (Eng.)
Cervus doma, Linn. Deer’s horn (Eng.)
Cervus elephus, Hart’s horn (Eng.)
Chelonia mydas, Turtle (Eng.)
Cimex hemipterus, Bugs (Eng.)
Cock
Columba sps. Pigeon (Eng.)
Conch
Central part of the conch shell.
Coral
Cow-dung.
Cuona alpinus’s testicles
Curd
The curd water
Cuttlefish Bone
Earthworm (Eng.) Pheritima posthum.
Egg (Eng.)
Elephas indicas (Elephant Eng.)
Epeira sps. Female Spider (Eng.)
Equus asinus, Linn. ass (Eng.)
Equus cabellus, Linn. Horse (Eng.)
Fel bovinum purificatum., Fel tauri depuratus, ox-bilegalls-tone (Eng.)
Felis chauss, Semen of wild cat (Eng.)
Felis chauss, Testes of wild cat (Eng.)
Formica sps. Small black ant.
Ghee
Hemiptera
Leech (Eng.) Hirudinaria granulosa.
Honey
Honey-sugar
Hyacna hyaem
Lcthyocolla (isinglass) (Silicate of lime).
Ingluvies
Insects of conch shell
Labea rohu or labeo rohita Hamand Buch. (Rohu-fist) Bile.
Lac
Lacerta scincus, Linn.
Liver
Mabuia sps.
Milk
Deleted
Moschus moschiferus, Kasturi-secretion of Musk deer.
Musca nebula. Bees (Eng.)
Mutilia occidentalis (Insects of bright scarlet colour)
Pavo cristatus. Linn. Peacock (Peahen).
Margaritifera, Pearls (Eng.)
Pearl shell
Pig
Pteropus giganteus, Bat
Lepus capensis, Rabbit (Eng.)
Rana tigrina, Frog (Eng.)
Rattus rathes and Mus musculus, Rat (Eng.)
Rhinoceros unicornis, Linn. Rhenoceros (Eng.)
Scilla serrata Crab (Eng.)
Selenarctas, thibetanus, Bear (Eng.)
Shell
Skull
Small Conch
Snake
Deleted
Suncus murinus. Musk rat (Eng.)
Tiger’s fat
Tigress’s Milk
Urine
Varannus monitor, Varanus (Eng.)
Wax
Wool
APPENDIX C

List of Some of the Pratinidhi (Substitute) Drugs Mentioned in Ayurvedic Pharmacopoeia

Draksha—Vitis Vinifera : Gambhari—Gmelina arborea
Dadim—Punica granatum : Vrikshamla—Gorcinia indica
Tagar—Valleriana wallichii : Jatamansi—Nardostachys jatamansi
Kokilaksha—Astercantha- : Gokshur—Tribulus terrestris
   longifolia
Prishaniparni—Vraria picta : Shalparni—Desmodium gangeticum
Kesar—Crocus Satirus : Haldi—Curcuma longa
Dhanyak—Coriander sativum : Sowa—Peucedanum graveolens
Moorva—Marsdenia reyele : Jingini—Marsdenia tinctoria
Pooshkarmool—Inularace- : Kushta—Saussurea lappa
   mosa
Chavya—Piper chaba : Talmali—Curculigo orchioides
Kutaj—Hollarhena antidy- : Talmali—Curculigo orchioides
   senterica
Rasna—Pluchea lanceolata : Bandak—Loranthus longifolia
Jira—Cuminum cyminum : Dhanyak—Coriander sativum
Chitrak—Plumbago zeyl- : Apamarg—Achyranthes as per
   enica
Dhamasa—Fegonia arabica : Jawasa—Linum usitatissimum
Tagar—Valeriana wallichii : Kushta—Saussurea lappa
Bavchi—Posrlea Coryli- : Chakramard—Cassia tora
   folia
Ativish—A conitum heterophyllum : Motha—Cyperus rotundus
<table>
<thead>
<tr>
<th>Honey</th>
<th>Old Jaggery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loh (Ferrum)</td>
<td>Mandur (Oxide of Iron)</td>
</tr>
<tr>
<td>Flowers</td>
<td>Unripe Fruits</td>
</tr>
<tr>
<td>Diamond</td>
<td>Pokhraj</td>
</tr>
<tr>
<td>Moti (Pearl)</td>
<td>Kaudi (Marina shell)</td>
</tr>
<tr>
<td>Gold</td>
<td>Loh (Ferrum)</td>
</tr>
<tr>
<td>Silver</td>
<td>Loh (Ferrum)</td>
</tr>
</tbody>
</table>
APPENDIX D

List of Ayurvedic Drugs Included in Indian Pharmacopoea, 1966.

Acacia arabica, Willd. : Indian acacia
Acacia catechu, Willd. : Black catechu
Aconitum chasmanthum, Stapf. : Aconite
Adhatoda vasica, Nees, : Vasaka
Aegle marmalos, corr. : Bael
Allium sativum, Linn. : Garlic
Aloe barbadensis, Mill. : Aloes
Alstonia scholaris, R. Br. : Alstonia bark
Anethum graveolens, Linn. : Dill
Anethum sowa, Kurz. : Sowa
Araohis hypogea, Linn. : Groundnut
Areca catechu, Linn. : Betel nut
Atropa acuminata, Royle. : Indian Belladona
Berberis asistica, DC. : Berberis root
Boerhavia diffusa, Linn. : Punarnava
Brassica juncea, Linn. : Brown mustard
Cannabis sativa, Linn. : Cannabis
Capsicum frutescens, Linn. : Capsicum
Carica papaya, Linn. : Papaya
Carum carvi, Linn. : Caraway
Cassia angustifolia, Vahl. : Senna
Cassia fistula, Linn. : Cassia fruit
Centella asiatica, (Linn) Urban. : Hydrocotyle
Cinnamomum Camphora, : Camphor
Cinnamomum Zeylichenum, Blume : Cinnamon
Citrus aurantium, Linn. : Bitter-orange peel
Citrus medica, (Linn) Burm. F. : Lemon peel
Coriander sativum, Linn. : Coriander
Crocus sativa, Linn. : Saffron
Cuminum cyninum, Linn. : Cumin
Curcuma longa, Linn. : Turmeric
Datura fastuosa, Nees. : Datura
Datura metal, Linn.
Datura stramonium, Linn.
Digitalis lanata, Ehrh.
Digitalis purpurea, Linn.
Elettaria cardamomum, Maton
Ephedra gerardiana, Wall.
Eugenia caryophyllus, Thunb.
Ferula foetida, Boiss.
Foeniculum vulgare, Mill.
Glycyrrhiza glabra, Linn.
Holarrhena antidysenterica, Wall.
Hydnocarpus kurzil, Warb.
Hydnocarpus wightiana, Blume
Ipomoea hederacea, Jacq
Ipomoea turpethum, R. Br.
Linum usitatissimum, Linn.
Lobelia nicotianaefolia, Heyne
Melia azadiracta, Linn.
Myristica fragrans, Hortt.
Papaver somniferum, Linn.
Picroorrhiza kuroa, Royle.
Pimpinella anisum, Linn.
Piper betel, Linn.
Piper cubeba, Linn.
Plantago ovata, Forsk.
Prunus amygdalus, Batsch.
Psoralea corylifolia, Linn.
Rauwolfia serpentina, Benth
Ricinus communis, Linn.
Santalum album, Linn.
Saraca indica, Linn.
Saussurea lappa, Clarke.
Seasamum indicum, Linn.
Swertia chirata, Buch-Ham.
Terminalia chebula, Retz. : Myrobalan
Tinospora cordifolia, Miera. : Tinospora
Trachyspermum ammi, (Linn) Sprague : Ajowan
Tylophora asthmatica, W & A. : Anantmula
Urginea indica, Kunth. : Indian squill
Valeriana wallichii, DC. : Valerian
Vitex peduncularis, Linn. : Vitex leaf
Withania somnifera, Dunal : Ashwagandha
Zingiber officinale, Rose. : Ginger
Man has always turned to nature to seek remedies for his ailments. Since the dawn of civilization, the plant kingdom has held out hopes for drugs that could effectively be exploited for treatment of ailments. Plant remedies were often used empirically and a number of formulations containing various parts of different plants were prescribed. Such folklore medicines have been universal and out of empiricism has emerged many a potent and effective drug.

In India, as elsewhere, a large number of plants have been described as useful in various ailments. The Atharvaveda mentions a number of plants of medicinal value, and a systematic treatise on the value of medicinal plants has been compiled by Charaka. The Charaka Samhita mentions over 200 medicinal plants for various disease-processes. They have been described as single remedies or as formulations. There are detailed descriptions on collection, methods of storage and preparation of drugs. Charaka has aptly pointed out that no new knowledge should be accepted except that which has been acquired by Pratyasha, Anumana, Yukti, and Aktopadesha.

Scholars of modern medicine were lured to these potential treasures of knowledge, to test and re-establish the claims made by ancient physicians. A profound study of Ayurvedic drugs was made by Hoernle, Julius Jolly, Ray, Garde and Waman Desai who have written several books on indigenous drugs.

A systematic study of medicinal plants was undertaken by Ramnath Chopra. His approach was mainly pharmacological. Thus, pharmacognostically identified plants were taken up for pharmacological screening. Extracts of their various parts like roots, bark or leaves were tested on animal tissues and
systems to investigate the pharmacodynamic actions of drugs. This pharmacological screening was done on plants mentioned in old ayurvedic classics purely empirically.

Although such a study yielded voluminous information on pharmacodynamic properties and served to lay the foundation for further pharmacological research, it failed to establish in a large number of cases, the claims of properties attributed to such plants. This led to some degree of scepticism as to the validity of such claims. This was not wholly conducive to the progress of drug research. Ideal screening procedures for evaluation of biological effects should have the following criteria; thus, they should be simple, quick and reproducible; simulate clinical conditions; in vivo/in vitro dose response possible; steep/flat dose response curve; natural root of administration possible; comparison with standard drug.

Biological evaluation of plant material presents some uncontrolled and complex problems. These are summarised in table no. 1. Phytoconstituents are known to vary depending upon climate, soil, humidity etc. Harvest time is a determining factor in a number of cases. Biogenesis of essential constituents by plants depends in a large measure on the nutrients and fertilisers provided to the plant during its growth. Distinct chemical races of plants are known to exist. Different species of the same genus present different quantity and quality of constituents. Boerhavia diffusa and erecta were found by us to vary in their biological activity. The selection of an appropriate solvent method of extraction is extremely crucial. Many solvents are either deleterious to essential plant constituents or may fail to extract the desired active ingredients. Most of the time the agonies of a plant chemist and biologist stem from the improper selection of a solvent for extraction. The method of extraction is equally important. Volatile materials will be lost in solvent extraction or in solvent boiling at low temperatures. The presence of antagonistic substances can result in a failure to detect either of the two or more active constituents. Many plants accumulate rather large quantities of toxic inorganic constituents such as K, Ca, Selenium, Nitrates, Copper, Magnesium etc. All of these may produce biological action on a system per se or interfere with actions of organic constituents present in the plant material. This
may lead to a premature extinction of interest in the plant material.

Active constituents may be distributed throughout the plant or may be located predominantly in flowers, fruits, stems, bulbs or roots. If proper choice of the plant part is not made, it may only lead to a negative result.

Ayurvedic drugs, unlike herbals investigated from other parts of the world, need not go through the stereotyped toxicity studies. These drugs have been used singly or in combination over several centuries without obvious deleterious effects. Further, their use in disease-processes have been elaborately described. This gives a lead to their biological and therapeutic properties and instead of a blind screening programme, it is possible, to plan a desired pharmacological model to establish claims and finally to elucidate mechanisms of action. It is only when phytochemistry has been worked out and active constituents identified and obtained in a purified form, that an investigator proceeds to undertake a detailed toxicological evaluation. There are very many sources for selection of plant material for evaluation. These are summarised in table no. 2. Out of these, standards, elaborate and valuable ayurvedic texts are a rich source of information.

Vakil (1949) reported the usefulness of Serpina (whole extract of Rauvolfia Serpentina in the treatment of hypertension). Its pharmacological properties were investigated by Paranjpe (1942) and then by Sen and Bose. Siddiqui and Siddiqui (1931) isolated two groups of alkaloids which differed in their pharmacological actions.

Reserpine has given an impetus to a vigorous search for newer drugs of the same class. Actions of reserpine proved interesting and heralded a new era in the field of phytopharmacology. There has been feverish activity to obtain drugs which can influence the biochemistry of brain-cells which will serve to elucidate some of the unsolved problems in psychiatry. All over the world, there has been a search to obtain drugs from the plant kingdom to relieve tension.

In India, there had been a search for plants described as nervine tonics. In ayurvedic classics, Soma-Rasa has been reputed since the time of the Puranas, but its exact identity has not been investigated for its tranquilising properties. We
had investigated the tranquilising effects of *Malkangni* oil (*Celastrus Paniculatus*) and reported its tranquilising activity (1957). One of the interesting developments from the angle of plant analysis is the reported tranquilising activity in the volatile oil fraction obtained from rhizomes of *Acorus Calamus* (Wacha) by Dandiya et al (1958, 1959, 1960). In this case Oleoresin was obtained which exhibited some very interesting properties like potentiation of barbiturate hypnosis, hypothermia and hypotension. LSD was found to block the hypnotic action only partially. Baxter and Kendel isolated two active principles from the oil—Asarone and Betaasarone which were investigated pharmacologically by Dandiya et al (1961) for their nervine effects. They were also found to potentiate the hypnosis by general anaesthetic, produce hypertension and blocked conditioned avoidance behaviour of rats. Another plant which is reputed as a nervine tonic is *Herpestis Monniera Linn* (*Brahmi*). Malhotra et al (1961) reported a glycoside Saponin, principle, (*hersponis*) which was found to have hypnotic and analgesic properties in toxic dose range. The same workers have reported its neuropharmacological activity and have further shown that the plant also contains nitorine—an exictant. Malhotra et al (1960) have reported the sedative activity of *Withania Somnifera* (Ashwagandha) roots, (Tables No. 3A and 3B). 70% alcoholic extract produced a sedative effect on mice, dogs, monkeys, rabbits and white rats. There have been studies on the tranquilising properties of Jatamansi which were not very conclusive. However, Arora et al (1958) have reported the antiarrhythmic properties of Jatamansone. Bhide (1962) has reported tranquilising activity in the ethanol extract of *Harik (Paspalum Scrobicilatum)*.

Anti-inflammatory activity has been studied using different models for experimental evaluation (Table 4A.). In a primary screening programme, carageein induced edoema in the rat foot pad is one of the most accepted models. The method has the advantage of rapid screening and gives a fairly complete idea of the anti-inflammatory potentialities of the drug.

There are many indigenous drugs reputed to be effective in inflammation. Two such plants have been studied by Gujral et al (1960) *Glycyrrhiza Glabra Linn* (Mulethi) has been
mentioned in *Atharvaveda*, *Rigveda* and also by Caraka as effective in inflammations. Aqueous extract of liquorice contains glycyrrhizin, a salt of glycyrrhizinic acid and yields on hydrolysis an aglycone, glycyrrhetic acid. Glycyrrhetic acid resembles corticoids in its chemical structure and therefore Gujral et al (1960) studied its anti-inflammatory activity in formaldehyde-induced arthritis in rats. They found that both glycyrrhizin 20mg/100 gm were as effective as 0.5 mg/100 gm of hydrocortisone and 10 mg/100 gm of butazolidine. Another plant which has been reported to be antiphlogistic is *Guggul*. Karandikar et al (1960) first reported that *Mahayograj Guggul* 100 mg/kg orally produced anti-inflammatory action. Gujral et al (1960) have investigated systematically the anti-inflammatory action of *Gum Guggul*, (*Balsamodendron Mukul, Hook*). This gum has been mentioned in all ancient ayurvedic texts as a drug useful in rheumatic disorders and nervous diseases. It has been used in the form of *Yograj Guggul* and *Mahayograj Guggul*, which contain many other ingredients. Gujral et al studied its different fractions and found that the anti-arthritic and anti-inflammatory activity was present in the oleoresin part—especially in lower terpenoid portions of oleoresin. The activity was found to be comparable to hydrocortisone and butazolidine in doses of 0.5 and 10 mg/100 gm respectively. This report should stimulate further interest in such plants, more so, because it may be economical to use these in preference to semi-synthetic corticoids. *Mahayograj Guggul* also contains *Rasna* as one of the ingredients. *Rasna* needs careful investigation. One of the difficulties however, is to obtain an authentic sample. Anti-inflammatory agents obtained from plants may serve either as substitutes for or, as synergistic agents with synthetic steroids and may serve not only to bring down the cost of treatment but may limit the toxicity of steroids which are required to be administered in higher doses for therapeutic activity.

Table No. 4B shows some of the drugs which we have screened for their anti-inflammatory activity against carrageenin induced oedema. *Boerhavia diffusa Linn* is particularly important as it forms one important ingredient of a prescription for visceral inflammations in Ayurveda.
The liver is an important organ in the body metabolic processes. Although modern medicine provides very elaborate data on liver functions and pathogenesis of many liver disease, there is as yet no drug in modern medicine that can cure liver dysfunctions. Ayurveda on the other hand provides recipes galore for liver disorders. We have screened some compounds in experimental liver dysfunction produced by chemically induced hepatotoxicity. Tables No. 5A and 5B show some of our data on two very commonly used drugs in hepatic dysfunctions.

The antibacterial, antiviral and antifungal activities of a compound can be evaluated in vitro as well as in vivo. In India, this is an important area of investigation of great national significance. Tables 6A and 6B show some plants investigated for their antibacterial activity. There are many pit-falls in these evaluations. We have to be particularly careful regarding the species of organism used, method of assay, the solvent system used for extraction of plant material, and the presence of substances that may precipitate the ingredients of a medium used for bacterial growth.

_Curcuma Longa Linn_ has been studied for its anti-infective and cholangogue actions by Ramprasad and Sirsi (1957), Rhizoms of Turmeric contain a colouring matter, Curcumin and an essential oil. These workers have reported in vitro the anti-bacterial action of sodium curcuminate.

One of the interesting developments in the trial of anti-infective drugs is the production of experimental cholera in infant rabbits reported by Datta (1955). He was able to produce a cholera-like syndrome in young rabbits and screen a large number of plant remedies. He has screened plants like _Holarrhena Anti-Dysenterica_ and _Leus Aromatica_ but failed to demonstrate their curative or preventive action.

Helminthiasis and protozoal infections are a scourge of the tropics and there are quite a few indigenous drugs which are described as useful in helmithic infestations. They need to be carefully evaluated clinically and pharmacologically, (Tables 7A, 7B and 7C.).

Drugs have been prescribed in Ayurveda for fevers. It is possible to evaluate anti-pyretic activity by simple experimental models. The anti-pyretic activity of a compound can be
studied in comparison with a standard drug such as aspirin, by inducing fever in rats by injecting 15% brewer’s yeast suspension intra-muscularly. Table No. 8 (fig) shows our data on Oxalis corniculata.

Pain possesses both subjective and objective components. In man, the sensation of pain is associated with a typical reaction pattern to noxious stimuli. It is impossible to simulate painful situations in experimental animal. However, several experimental models have been designed for initial screening of drugs as analgesics. We have used methods such as tail clip, hot plate, tail shock etc. Table No. 9 shows our data on one of the drugs observed for analgesic activity. It must be emphasized that the ultimate proof of analgesic activity of any drug will be in man.

There are a large number of drugs prescribed in Ayurvedas for Sotha Roga. Most of these have the end result of inducing diuresis. We have several models for studying diuretic activity. One of the simplest, but precise is to study the pattern of diuresis in water loaded rats over a fixed period of time. Table no. 10 shows data on Boerhavia diffusa Linn a well-known drug prescribed in Ayurveda for its effectiveness in Shotha Roga.

One of the fruitful fields of research in synthetic drugs is the introduction of an ever-increasing series or oral diuretics. With the introduction of Benzothiodiazine group of drugs, some of the major drawbacks of organic mercurials have been eliminated. Shotha Roga has been treated in Ayurveda by a number of therapeutic measures intended to correct the vitiation or imbalance of Doshas. Some of these are known to cause diuresis. A large number of plants have been studied for their diuretic activity. Plants like Punarnava and Gokhru have been investigated. A few have been shown to produce diuresis. Nimbidinate, an active principle obtained from Nimb, was one such substance reported by Bhide et al (1958) as a diuretic.

A plant can be screened for multiple activities. Shatawari is a very reputed plant in Ayurvedic and is endowed with several properties. We have screened the plant for a number of distinct biological effects as shown in Table No. 11.

One of the important areas of great significance in the Indian context is to see safe, effective and reversible anti-
fertility agent in females or males. Table No. 12A shows plants reputed to possess anti-fertility activity.

Table No. 12B describes the screening tests we employed to study the anti-fertility activity and also to locate the site of action.

Many drugs are known to affect the female reproductive system. There are a number of pharmacodynamic models to study the estrogenic or progestinal activity of a drug. Tables No. 13A and 13B shows our data on screening of estrogenic activity of one of the Ayurvedic drugs used in menstrual disorders.

Diabetes mellitus is one of the oldest diseases the etiology and pathogenesis of which is still obscure. It is, therefore, natural that many plant remedies have been used from time to time and investigated for their claims as anti-diabetic agents. Mukherjee (1957) has reviewed the work on indigenous drugs in diabetes. None of these earlier attempts have resulted in any gains, although this may be partly due to defective methods used in screening such agents. Two plants were studied for hypoglycaemic action by workers at Poona. Shrottri and Aiman (1960) have reported a mild hypoglycaemic action of Ficus Bengalenesis Linn, and F. Glomerata in normal and alloxan diabetic rabbits. They have also reported a glycosidal principle obtained from Ficus bengalenesis which was hypoglycaemic in normal but not in diabetic animals. Introduction of the Tolbutamides and Diguamides as oral hypoglycaemic agents has stimulated further work on elucidation of the diabetic syndrome. It has also given an impetus to research in herbal drugs which could either act alone in mild diabetes or at least potentiate the actions of other hypoglycaemic agents. Hypoglycaemic activity of Memordica Charantia (Kerala) was reported by Vad (1961). This drug has undergone an intense chemical analysis and Siddiqui is reported to have isolated a crystalline principle. Kulkarni and Gaitonde have reported the potentiation of the action of Tolbutamide by Kerala and Jadad Bhasma. The latter compound was studied by Sathe (1960) and was reported to be active in a few cases of diabetes mellitus. These actions are studied in normal rabbits and rats made hypoglycaemic by alloxan.
Success in chemotherapy of bacterial infections has naturally stimulated interest in seeking drugs for the treatment of malignant disorders. There are three main approaches to the problems of cancer therapy: (a) biochemical—to seek an anti-metabolite (b) anti-viral agents—virus considered as a conditioning factor for abnormal growth (c) selective anti-mitotic agent. If there is any hope of chemical treatment of cancer, it is reasonable to expect that such an agent is as likely to originate from plants as from the laboratory of a synthetic chemist.

A large number of plants have been screened for their action against experimentally induced Yushido sarcoma (Ascitic cell tumour, mouse fibrosarcoma or egg cultivated mammary carcinoma. Thus Dalal et al (1959) tested 91 plant species, while Mukenna et al (1960) have screened 498 plants for growth inhibitory activity against RC mammary adenocarcinoma. Seven plants in the family composite were found to be active. Two plants Conocarpus erecta and Calittris Quadrivalis inhibited two types of tumours. The anti-cancer activity of Opuntia Maxima and Papaver Rheoes Linn and Papaver Orientale Linn have been reported. One of the plants described in Ayurveda of interest in medicinal properties is Vinca Rosea. This plant was extensively studied for its sedative and hypoglycaemic action. Noble et al (1959) have reported anti-tumour activity of an active principle Vinca leukoblastine effective against mouse leukaemia and against Swiss mouse sarcoma VLB injected I.P. or S.C. or I.C. in a dose of 0.4 to 0.8 mg/kg prolonged survival of mice bearing ascitic tumour. VLB was also active when incubated with tumour cells. Recently Ambaye et al (Personal communication 1962) from I.C.R.C. Bombay have been studying anti-tumour activity of a few indigenous plants. They have found two plants promising—Pongamia Glabra (Karanji) and Hippophae Salicifolia (Kalabis). One of the commonly used plants in Ayurveda is Bilwa, Semicarpus Anacardium. Vad (1960-61) has reported anti-cancer properties of Bilwa. Progress of chemotherapy of cancer is directly linked with understanding of the carcinogenesis. The biochemical approach to the problem has yielded very promising anti-metabolites, the latest being Diacetol reported by Sahashrabudhe et al (1960) from the Biology
Division of Atomic Energy. However, there is considerable scope for investigating plant remedies with a selective action on tumour cells.

An important realisation on the basis of past experience in the field of indigenous drug research is the need to have coordinated research activity. It is no use screening plants purely on empiricism. Apart from the academic interest in plant research, the work is of immense economic significance, since the object would be to provide cheaper and more effective remedies. To achieve this, the commonly prescribed drugs in Ayurveda should be studied to establish their claims beyond doubt. Much of the efforts could be saved if such drugs which have stood the test of time and proved non-toxic in man, could be screened clinically by modern techniques of clinical research. This can be done more effectively in close collaboration with ayurvedic physicians. Plants which are to be taken for clinical study must be properly identified pharmacognostically and their distribution and habitat studied carefully, so that there could be a continuous supply of authentic unadulterated material. Having established the claims, the plants may then be studied for their pharmacodynamic activity and simultaneously analysed chemically. (Table No. 14).

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Table No. 1A : Estimated Number of Plant Species (Norman R Farnsworth, 1966)

**Thallophyta**

(a) Bacteria 1,500
(b) Fungi 100,000
(c) Algae 19,000
(d) Lichens 20,000

**Bryophyta** 14,000

**Pteridophyta** 10,000

**Spermatophyta**
Table No. 1B: Pitfalls in Biological Evaluation of Plant Material

1. Variability of Phytoconstituents
   (a) Climate
   (b) Harvest Time
   (c) Soil
   (d) Nutrients
   (e) Plant Species—Identification
   (f) Plant Part
   (g) Drying Conditions
2. Choice of Solvent
3. Presence of Antagonist Substances
4. Inorganic Constituents
5. Choice of Biological System

Table No. 2: Sources of Information for Medicinal Plant Evaluation

1. Folklore Medicine
2. Ayurvedic Texts
   Samhitas
   Commentaries
   Modern Treatise
3. Medical Botany and
   Ethno Botany
4. Field Explorations

Table No. 3A: Preliminary Screening for Tranquilisers

1. Normal Behaviour—Cat, Rat, Monkey
2. Pentobarbitone Potentiation
3. Conditioned Behaviour
4. Amphetamine Toxicity
5. Acto photometer/Jigglecage
### Table No. 3B

<table>
<thead>
<tr>
<th>Name of the Plant</th>
<th>Activity studied for C.N.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Celastrus Paniculatus (Malkangni oil)</td>
<td>Sedative, Anticonvulsant, Tranquilizer</td>
</tr>
<tr>
<td>Acorus Carmus (Bhadra)</td>
<td>Tranquilizer</td>
</tr>
<tr>
<td>Withania Somnifera (Ashwagandha)</td>
<td>Depressant, Tranquilizer-Sedative, Anticonvulsant, Hypothermia, Potentiation of Barbiturate, Ethanol, Urethane Sleeping time</td>
</tr>
<tr>
<td>Herpestis Monniera (Brahmi)</td>
<td>Tranquilizer, Reduced Spontaneous motor activity, Hypothermia</td>
</tr>
<tr>
<td>Paspalum Scrobiculatum Harik</td>
<td>Tranquilizer</td>
</tr>
</tbody>
</table>

### Table No. 4A : Different Methods used in Screening Anti-inflammatory Activity of Plant Extracts

<table>
<thead>
<tr>
<th>Method</th>
<th>Animal Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) 1. Carrageenan Induced Edema</td>
<td>Rat</td>
</tr>
<tr>
<td>2. Formalin Induced Edema</td>
<td>Rat</td>
</tr>
<tr>
<td>3. Kaolin Induced Edema</td>
<td>Rat</td>
</tr>
<tr>
<td>4. Dextran and Ovalbumin Induced Edema</td>
<td>Rat</td>
</tr>
<tr>
<td>5. Yeast Induced Edema</td>
<td>Rat</td>
</tr>
<tr>
<td>6. Mediator Induced Edema</td>
<td>Rat</td>
</tr>
<tr>
<td>(B) Cotton Pellet Granuloma</td>
<td>Rat</td>
</tr>
<tr>
<td>(C) UV-Induced Erythema</td>
<td>Guinea-Pig</td>
</tr>
<tr>
<td>(D) Granuloma Pouch</td>
<td>Rat</td>
</tr>
<tr>
<td>(E) Adjuvant Induced Arthritis</td>
<td>Rat</td>
</tr>
</tbody>
</table>

### Table No. 4B: Anti inflammatory Activity of Boerhavia Diffusa (Ethyl Acetate Extract) by Carragenin Induced Oedema

<table>
<thead>
<tr>
<th>Drug</th>
<th>% Inhibition of Inflammation</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Diffusa Sample No. 1 (250 mg/kg oral)</td>
<td>25</td>
</tr>
<tr>
<td>B.Diffusa Sample No. 2 (250 mg/kg oral)</td>
<td>34</td>
</tr>
<tr>
<td>Phenylbutazone (50 mg/kg oral)</td>
<td>48</td>
</tr>
<tr>
<td>Hydrocortisone (40 mg/kg oral)</td>
<td>70</td>
</tr>
</tbody>
</table>
Table No. 5A: Liver Disorders

<table>
<thead>
<tr>
<th>Drug</th>
<th>Part used</th>
<th>Active Principle</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phyllanthus Niruri</td>
<td>Whole Plant</td>
<td>Crude Extract</td>
<td>Jaundice</td>
</tr>
<tr>
<td>(Bhumyamalaki)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Picrorhiza Kuroa</td>
<td>Root</td>
<td>1. Alcoholic</td>
<td>Jaundice</td>
</tr>
<tr>
<td>(Kutaki)</td>
<td></td>
<td>Extract</td>
<td>(Infective</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hepatitis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Glycoside</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Kutkin)</td>
<td></td>
</tr>
<tr>
<td>Crataeva Nurvala</td>
<td>Bark</td>
<td>1. Alcoholic</td>
<td>Jaundice</td>
</tr>
<tr>
<td>(Veruna)</td>
<td></td>
<td>Extract</td>
<td>(Infective</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hepatitis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Crude</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extract</td>
<td></td>
</tr>
</tbody>
</table>

Table No. 5B: Effect of Alcoholic and Water Extracts of Picrorhiza Kuroa (2mg/kg) administered orally to Animals Pretreated with Carbon Tetra Chloride on SGPT, SGOT, LDH, Alkaline Phosphatase at the end of fourth week

| Micromoles of Pyruvite Per Minute Per Litre of Serum |

<table>
<thead>
<tr>
<th></th>
<th>SGOT</th>
<th>SGPT</th>
<th>LDH</th>
<th>A.P. K-A Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>53.26</td>
<td>74.58</td>
<td>645.96</td>
<td>35.91</td>
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<tr>
<td></td>
<td>±2.26</td>
<td>±2.6</td>
<td>±11.96</td>
<td>±0.51</td>
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<tr>
<td>Liq. Paraffin</td>
<td>52.52</td>
<td>78.64</td>
<td>623.15</td>
<td>40.78</td>
</tr>
<tr>
<td></td>
<td>±2.55</td>
<td>±2.56</td>
<td>±39.81</td>
<td>±1.53</td>
</tr>
<tr>
<td>Carbon Tetra-chloride (CCL4)</td>
<td>88.95</td>
<td>108.50</td>
<td>987.14</td>
<td>51.26</td>
</tr>
<tr>
<td></td>
<td>±1.39</td>
<td>±3.7</td>
<td>±20.50</td>
<td>±0.86</td>
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<tr>
<td>P. Kurooa</td>
<td>43.83</td>
<td>99.52</td>
<td>998.14</td>
<td>49.31</td>
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<tr>
<td>Water Extract</td>
<td>±2.61</td>
<td>±5.32</td>
<td>±32.27</td>
<td>±1.65</td>
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<tr>
<td>P. Kurooa</td>
<td>36.78</td>
<td>72.42</td>
<td>1477.61</td>
<td>28.14</td>
</tr>
<tr>
<td>Alcohol</td>
<td>±2.70</td>
<td>±3.11</td>
<td>±63.72</td>
<td>±1.94</td>
</tr>
<tr>
<td>Extract</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug</td>
<td>Part used</td>
<td>Active principle</td>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------</td>
<td>---------------------------</td>
<td>---------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Adathoda Vasaka (Vasa)</td>
<td>Leaves</td>
<td>1. Vasaka Crude</td>
<td>Against S. Aereus Sal. Typhosa</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Water Soluble</td>
<td>V. Cholera, E. Coli</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S. Shiga S. Flexner and S. Sonnei</td>
<td></td>
</tr>
<tr>
<td>Cassia Fistula (Aragwadha)</td>
<td>1. Leaves</td>
<td>1. Acetone Extract</td>
<td>Against Staph. Aureus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Stem and Bark</td>
<td>2. Alcohol Extract</td>
<td>Staph. Albus B. Megathelum</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Ether Extract</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipper Longum (Pippali)</td>
<td>Berry (Fruit)</td>
<td>1. Waxy Alkaloid</td>
<td>Anti-Tubercular</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Amide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensete Superbum (Banakdali)</td>
<td>Seeds</td>
<td>VDR-2 GD</td>
<td>Against Small-pox Virus</td>
<td></td>
</tr>
</tbody>
</table>
Table No. 6B : Anti-bacterial Screening Systems Used

1. In Vitro Assay
   Agar Diffusion
   Broth Culture

2. Selection of Organism
   Gram +ve ——— Staph.
   Gram -ve ——— E.Coli.
   Fungi
   Mycobacteria
   Antiviral Screening

1. Yolksac Adapters
   Virus : Vaccinia
   Influenza
   Varioal
   Survival of Chick Empryo

2. Mice, Rabbits
   Rabies, Polio

Table No. 7A : Experimental Evaluation Anthelmintics

1. In Vitro Test : Ova Hatching Test
2. Goodwin’s Isolated Worm Isolate Preparation
3. Isolated Nerve Muscle Preparation
4. Biochemical and Metabolic Tests
Table No. 7B: Laboratory Techniques

Ova Count—1. Smear

2. Concentration

Stolls, Kato, Beaver, Mapleton

Deworming — 1. Worm Count
2. Period: 24 HRS
   48 HRS, 72 HRS

Table No. 7C: In Vitro Evaluation of Anthelmintics

(Gaitonde 1971)

Animal Test Systems—Primary Screening

<table>
<thead>
<tr>
<th>Animal Test</th>
<th>Nematode</th>
<th>Cestode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse</td>
<td>Nematospiroides</td>
<td>Hymenolepis</td>
</tr>
<tr>
<td></td>
<td>Dubius</td>
<td>Nana</td>
</tr>
<tr>
<td>Rat</td>
<td>Nematospiroides</td>
<td>Hymenolopis</td>
</tr>
<tr>
<td></td>
<td>Dubius</td>
<td>Diminuta</td>
</tr>
<tr>
<td>Dog</td>
<td>Toxocara Canis</td>
<td>Hymenolepis</td>
</tr>
<tr>
<td></td>
<td>Ancylostoma Caninum</td>
<td>Diminuta</td>
</tr>
<tr>
<td>Cat</td>
<td>Toxascaris Leonina</td>
<td>Hydatigera</td>
</tr>
<tr>
<td></td>
<td>Ancylostoma Caninum</td>
<td>Taeniasiformis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Initial Temp. C</th>
<th>Temp. after yeast</th>
<th>Temperature after drug treatment</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>1 ml</td>
<td>Oral</td>
<td>35.7 ± 0.17</td>
<td>37.5 ± 0.22</td>
<td>37.5 ± 0.22</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>37.5 ± 0.17</td>
<td>37.1 ± 0.15</td>
<td>37.1 ± 0.15</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>37.1 ± 0.15</td>
<td>37.1 ± 0.2</td>
<td>36.9 ± 0.2</td>
<td>5</td>
</tr>
<tr>
<td>Aspirin</td>
<td>600 mg/kg</td>
<td>Oral</td>
<td>34.5 ± 0.18</td>
<td>36.4 ± 0.22</td>
<td>35.0 ± 0.22</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>34.6 ± 0.18</td>
<td>34.6 ± 0.35</td>
<td>33.9 ± 0.35</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>33.9 ± 0.35</td>
<td>34.1 ± 0.44</td>
<td>34.1 ± 0.35</td>
<td>5</td>
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<tr>
<td>Benzene extract</td>
<td>500 mg/kg</td>
<td>Oral</td>
<td>34.6 ± 0.21</td>
<td>36.5 ± 0.21</td>
<td>34.7 ± 0.51</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>34.6 ± 0.21</td>
<td>34.6 ± 0.35</td>
<td>34.1 ± 0.35</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>34.1 ± 0.35</td>
<td>34.7 ± 0.22</td>
<td>35.6 ± 0.21</td>
<td>5</td>
</tr>
<tr>
<td>Chloroform extract</td>
<td>500 mg/kg</td>
<td>Oral</td>
<td>35.1 ± 0.11</td>
<td>36.9 ± 0.2</td>
<td>35.6 ± 0.2</td>
<td>1</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>35.6 ± 0.2</td>
<td>35.2 ± 0.28</td>
<td>34.7 ± 0.28</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>34.7 ± 0.28</td>
<td>36.0 ± 0.06</td>
<td>36.1 ± 0.02</td>
<td>5</td>
</tr>
<tr>
<td>Petroleum</td>
<td>500 mg/kg</td>
<td>Oral</td>
<td>35.1 ± 0.03</td>
<td>37.4 ± 0.09</td>
<td>36.9 ± 0.03</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>36.9 ± 0.03</td>
<td>35.5 ± 0.22</td>
<td>35.0 ± 0.03</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35.0 ± 0.03</td>
<td>36.3 ± 0.67</td>
<td>36.2 ± 0.17</td>
<td>5</td>
</tr>
<tr>
<td>Drug</td>
<td>Dose mg/kg</td>
<td>Route</td>
<td>Initial Readings (Seconds)</td>
<td>Readings after 30 Minutes</td>
<td>Readings after 60 Minutes</td>
<td>Readings after 90 Minutes</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>-------</td>
<td>---------------------------</td>
<td>----------------------------</td>
<td>----------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Control</td>
<td>1 ml</td>
<td>i.p.</td>
<td>8.03</td>
<td>8.94</td>
<td>±0.34</td>
<td>±0.14</td>
</tr>
<tr>
<td>Tween-80</td>
<td></td>
<td></td>
<td>+0.31</td>
<td></td>
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<tr>
<td>Morphine</td>
<td>10</td>
<td>i.p.</td>
<td>7.8</td>
<td>47.0</td>
<td>±7.4</td>
<td>26.5</td>
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<td>Petroleum</td>
<td>500</td>
<td>i.p.</td>
<td>±3.35</td>
<td>18.66</td>
<td>±10.4</td>
<td>±4.9</td>
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<tr>
<td>Ether Ex.</td>
<td></td>
<td></td>
<td>+0.42</td>
<td>+5.61</td>
<td>+7.17</td>
<td>+7.89</td>
</tr>
<tr>
<td>Choloroform</td>
<td>500</td>
<td>i.p.</td>
<td>7.2</td>
<td>16.9</td>
<td>+4.8</td>
<td>+2.7</td>
</tr>
<tr>
<td>Extract</td>
<td></td>
<td></td>
<td>±0.34</td>
<td>25.0</td>
<td>±2.7</td>
<td>+5.8</td>
</tr>
<tr>
<td>Benzene</td>
<td>500</td>
<td>i.p.</td>
<td>7.82</td>
<td>13.6</td>
<td>±5.5</td>
<td>±1.67</td>
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<tr>
<td>Extract</td>
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<td></td>
<td>±0.19</td>
<td>+1.3</td>
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</table>
### Table No. 10: Effect of Petroleum Ether Extract of various samples of Boerhavia Diffusa on percent Excretion of Administered Saline, Total Output, Sodium and Potassium in 24 hours.

<table>
<thead>
<tr>
<th>Group</th>
<th>Control</th>
<th>Oral 250 mg/kg</th>
<th>Oral 250 mg/kg</th>
<th>Oral 250 mg/kg</th>
<th>Oral 250 mg/kg</th>
<th>Oral 250 mg/kg</th>
<th>Oral 250 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sample 1</td>
<td>Sample 2</td>
<td>Sample 3</td>
<td>Sample 4</td>
<td>Sample 5</td>
<td>Sample 6</td>
<td>Sample 6</td>
</tr>
<tr>
<td>Dose</td>
<td>% Excretion</td>
<td>Oral 250 mg/kg</td>
<td>Oral 250 mg/kg</td>
<td>Oral 250 mg/kg</td>
<td>Oral 250 mg/kg</td>
<td>Oral 250 mg/kg</td>
<td>Oral 250 mg/kg</td>
</tr>
<tr>
<td>Route</td>
<td>Oral</td>
<td>Oral</td>
<td>Oral</td>
<td>Oral</td>
<td>Oral</td>
<td>Oral</td>
<td>Oral</td>
</tr>
<tr>
<td></td>
<td>50.7 ± 2.7</td>
<td>52.2 ± 5.05</td>
<td>49.0 ± 6.1</td>
<td>39.0 ± 6.5</td>
<td>86.9 ± 3.3</td>
<td>0.001</td>
<td>0.001</td>
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<tr>
<td></td>
<td>13 ± 1.8</td>
<td>13.5 ± 2.4</td>
<td>10.9 ± 2.5</td>
<td>21.0 ± 2.4</td>
<td>14.4 ± 1.88</td>
<td>21.0 ± 1.95</td>
<td>10.5 ± 1.55</td>
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<tr>
<td></td>
<td>2.06 ± 0.4</td>
<td>2.04 ± 0.41</td>
<td>1.56 ± 0.43</td>
<td>2.13 ± 0.38</td>
<td>3.05 ± 0.38</td>
<td>1.53 ± 0.30</td>
<td>2.06 ± 0.30</td>
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<td>Potassium(mEq)</td>
<td>1.46 ± 0.096</td>
<td>1.53 ± 0.16</td>
<td>1.16 ± 0.25</td>
<td>1.309 ± 0.35</td>
<td>1.71 ± 0.35</td>
<td>6.2 ± 0.23</td>
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<tr>
<td>Extract</td>
<td>Diuretic</td>
<td>Anabolic Activity</td>
<td>Anti-ADH Activity</td>
<td>Anti-Oxitocic Activity</td>
<td>Mammamotropic Activity</td>
<td>Human Toxicity Study</td>
<td>No Toxicity</td>
</tr>
<tr>
<td>------------------</td>
<td>----------</td>
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<td>------------------------</td>
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<tr>
<td>Alcohol</td>
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<tr>
<td>Ethyl Acetate</td>
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<tr>
<td>Acetone</td>
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<td>Absent</td>
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<td>Petroleum Ether</td>
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<td>-</td>
<td>Present</td>
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<tr>
<td>Saponin Mixture</td>
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<td>Absent</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Present</td>
<td>-</td>
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<tr>
<td>Saponin A4</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>Present</td>
<td>Absent</td>
</tr>
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</table>
Table No. 12A: Post-Coital effect of Drug D₁ on the Fertility of Female Rats and Mice

<table>
<thead>
<tr>
<th>Animals</th>
<th>Dose and Route of Administration</th>
<th>Pregnant/Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rats</td>
<td>500 mg/kg/day × 3 Oral</td>
<td>Control 6/6, Treated 0/10</td>
</tr>
<tr>
<td>Mice</td>
<td>500 mg/kg/day × 3 Oral</td>
<td>Control 7/7, Treated 0/12</td>
</tr>
</tbody>
</table>

Table No. 12B

Choice of Animals:

*Rat
*Mouse
*Rabbit

In Female

Drug Administration
Pre-Ovulatory
Post-Ovulatory
Postcoital
Precoital
After Implantation
Induction of Ovulation

Parameters
Ova in Oviduct
Implants
Reabsorptions
Pseudo Pregnancy
Fetus at Cesarean
Deciducal Cells Abortion

In Male

Inhibition of Spermatogenesis
Cohabitation Tests
Formation of Non-functional Spermatozoa
<table>
<thead>
<tr>
<th>Drugs</th>
<th>Dose</th>
<th>Route</th>
<th>Average uterine weight mg/100 gm of body wt. ±S.E.</th>
<th>Average uterine glycogen ug/100 mg of tissue ±S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethinyl oestradiol</td>
<td>0.001 ug</td>
<td>Subcutaneous</td>
<td>139 ±6.6</td>
<td>270 ±35.4</td>
</tr>
<tr>
<td>Ethinyl oestradiol</td>
<td>0.005 ug</td>
<td>Subcutaneous</td>
<td>208 ±12.65</td>
<td>280 ±43.1</td>
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<tr>
<td>Ethinyl oestradiol</td>
<td>0.02 ug</td>
<td>Subcutaneous</td>
<td>248 ±18.07</td>
<td>390 ±55.6</td>
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<td>Petroleum ether extract of Vidharikand</td>
<td>125 mg/kg</td>
<td>Oral</td>
<td>228 ±18.46</td>
<td>342 ±39.3</td>
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<td>Petroleum ether extract of Vidharikand</td>
<td>250 mg/kg</td>
<td>Oral</td>
<td>243 ±29.76</td>
<td>400 ±34.9</td>
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<tr>
<td>Petroleum ether extract of Vidharikand</td>
<td>500 mg/kg</td>
<td>Oral</td>
<td>286 ±20.1</td>
<td>560 ±46.1</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olive Oil</td>
<td>0.1 ml</td>
<td>Subcutaneous</td>
<td>38 ±2.38</td>
<td>142 ±3.35</td>
</tr>
<tr>
<td>Tween-80 + water</td>
<td>0.1 ml</td>
<td>Oral</td>
<td>33 ±3.74</td>
<td>134 ±4.69</td>
</tr>
<tr>
<td>Drug</td>
<td>Dose</td>
<td>Route</td>
<td>Average uterine weight mg/100 gm of body wt. ± S.E.</td>
<td>Average uterine glycogen ug/100 mg of tissue ± S.E.</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------</td>
<td>-----------</td>
<td>--------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Petroleum ether fraction I</td>
<td>50 mg/kg</td>
<td>Oral</td>
<td>79 ±0.0574</td>
<td>271 ±26.72</td>
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<tr>
<td>Petroleum ether fraction II</td>
<td>50 mg/kg</td>
<td>Oral</td>
<td>79 ±0.911</td>
<td>232 ±17.24</td>
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<tr>
<td>Petroleum ether fraction III</td>
<td>50 mg/kg</td>
<td>Oral</td>
<td>55 ±7.31</td>
<td>247 ±8.185</td>
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<td>Petroleum ether fraction IV</td>
<td>50 mg/kg</td>
<td>Oral</td>
<td>56 ±7.667</td>
<td>246 ±21.61</td>
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<tr>
<td>Ethinyl oestadiol</td>
<td>0.001 ug</td>
<td>Subcutaneous</td>
<td>139 ±6.6</td>
<td>270 ±21.61</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olive oil</td>
<td>0.1 mg</td>
<td>Subcutaneous</td>
<td>38 ±2.38</td>
<td>142 ±3.35</td>
</tr>
<tr>
<td>Tween-80+water</td>
<td>1.0 ml</td>
<td>Oral</td>
<td>33 ±3.74</td>
<td>134 ±4.69</td>
</tr>
</tbody>
</table>
Table No. 14: Scheme for Study of Ayurvedic Drugs

Collection of Crude Drug
\[ \downarrow \]
Pharmacognosy
\[ \downarrow \]
Supply of Authentic Sample Crude Drug
\[ \downarrow \]
Clinical Evaluation (Ayurveda)
\[ \downarrow \]
Clinical Evaluation (Modern Methodology)
\[ \downarrow \]
Establish Claim
\[ \downarrow \]
Adopt in N.F.I. (Crude Drug)
\[ \uparrow \]
\[ \uparrow \]
\[ \uparrow \]
\[ \uparrow \]
\[ \downarrow \]
Clinical Evaluation
\[ \downarrow \]
Phase I
Phase II
Phase III

Chemical Extraction
\[ \downarrow \]
Preliminary Pharmacological Screening
\[ \downarrow \]
Chemical Constituents
\[ \downarrow \]
Pharmacological Data
\[ \downarrow \]
Active Ingredient → Chemistry
\[ \downarrow \]
Toxicity → Acute
\[ \rightarrow \]
Chronic
Man and Matter in the Evolution of the Universe

The whole universe according to Ayurvedic science, consists of five proto-elements namely Pancha Mahabhutas, F. No. 1. This has already been dealt with in the earlier essays in this book.

The present subject is based on the maintenance of the equilibrium of Pancha Mahabhuta and Tridosha by the drugs are made of Pancha Mahabhutas, the specific administration of a particular drug in the deficiency of a particular Mahabhuta in the physiological unit will correct deficiency. The drug and physiological unit differ as to their qualities, the former being inanimate and the latter animate. Even so, the management of disease in the above mentioned manner will be quite useful.

Classification of Dravya (Matter)

As you have already heard about the concept of the world according to this theory and the uses of ways and means (drugs) to keep sound health and the drugs to prevent and cure the ailments of human beings, this subject covers the drugs which are mainly obtained from three sources namely:— the Vegetable Kingdom, Animal Kingdom & Native Source. This is described by Agnivesh in Charaka and all other writers of Ayurvedic books namely Audbhoidam, Jangamam and Parthiwm respectively. F. No. 2.

Of the three sources, the first two are the products of the animate group Chetna=Sendripa=Organic, and the third one is the outcome of the inanimate Achetna=Nirindriya=Inorganic, F. No. 3.
When one refers to the use of Rasa and other Minerals in Ayurveda, one means the second and third sources of the drug. The first, vegetable kingdom, is being taken under Dravyaguna.

**Action of Dravya (Drug) on the Biological Unit**

Under the subject “Concept of pharmacological Principles in Ayurveda”, we have the Rasa, Guna, Veerya, Vipaka and Prabhawa theory. In the use of Rasa and minerals etc., we observe mainly the Prabhawa (the specific action) of a drug, F. No. 4.

*Drugs Covered by the Rasa Shastra.* (Science of Mercury and other minerals) :

(A) *Jangamam*: From the animal kingdom we mainly use honey, milk, curd, butter milk, ghee, urine and the dung of the cow, buffalo, horse, camel, flesh, hair, bristles, a kind of yellow pigment (gall bladder stone), skin, semen, bone sinew, horn, nails, hoof etc., F. No. 5.

(B) *Parthiham*: The drugs of this group are reclassified by Rasa Siddhas as Rasa or Mercury, the heavy metal, which is the main drug under Rasa Shastra, F. No. 6. Eight *Uparasas* viz. Sulphur, Heamatite, Ferrous Sulphate, Alum, Orpiment, Realgar Antimony, Gambose, F. No. 7. Eight Maharasas namely Mica, Flourspar, Pyrite, Iron Pyrite, Black bitumen, Peacock ore, Bismuth Kalamine. F. No. 8 and eight *Sadharana Rasas*, viz. Kampillak (Mellotous Phillipinaces), Arsenic Trioxide, Ammonium Choloride, shell of Cypraea moneta i.e. porcelaneous shells, Ambergris, Red oxide of Mercury, Cinnabar, Litharge F. No. 9.

These can be described as secondary, minerals, minerals and common minerals, respectively. These are the supporters to promote the actions of Rasa. In practice we may mix any of these drugs together and prepare nearly seven forms of medicine and administer them human beings. These are called Rasa Ushadhas. The Koopipakwa Rasayana, Khalweeya Rasa are the main classifications of the Rasaushdhis under which, innumerable medicines are being prepared by Ayurvedic practitioners.
References for these medicines are available in Rasa Yoga Sagar Brihat Yoga Torangini, Yogaratnakar etc.

We use metals and alloys which are classified into Sarlohas, Putilohas and Mishralohas.

Precious gems and other important stones are classified under Ratnas and Upratnas. We also use poisonous and potentially poisonous drugs. These are divided under Vish and Upvisha Varga. In all these are nearly 100 drugs. Charaka has taken some of the drugs namely gold, silver, copper, iron, lead, tin, Zinc, Ferrozo Ferric-oxide and other oxides of metals in the Parthiwa group. Moreover, he has mentioned the use of sand, lime, realgar, orpiment, precious and other important stones, salts, Hammatite, Antimony etc., in this group, F. No. 10.

The Aims and Objects of Rasa Shastra in Brief

The aims of Rasa Shastra are to study the native products of the universe and use them for the human beings with the help of Jangama and Audbhida groups. By the use of such medicaments a person will be able to serve mankind and will achieve the immortal state.

Rasa Shastra has a special branch namely Bhaishyja—Kalpana under which we purify all such Rasa, minerals, poisonous and semi-poisonous drugs to convert them into ambrosial form. This process is known as Shodhana Maran etc. For example iron is a common drug in various formulations in modern therapy as well as in Ayurvedic therapy. Generally it is constipative but the purified, Pakwa by various Pakas, Marit and Amriteekrit Iron Bhasma is not constipative according to Ayurvedic practice. Mercury, the heavy metal is poison but Sanskrit and Marit and converted into various forms of Kalpas, mercury is not poisonous but beneficial, F. No. 11 as described below.

1. Mercury, when administered in a medicinal form (Moorchana) with other drugs like sulphur etc. cures ailments.

2. When the physical properties of mercury, mainly quickness etc. are removed, it will come to the stage of Bandhan. If one is able to perform this operation, in spite of all perils and difficulties, one will get psychological strength.
3. He who succeeds in the efforts of Marana, will possess endless fame.

Thus Mercury prevents the body from ailments and cures the diseased physique. It enhances the psychological power of the human being and by getting such perfect health, the person works hard and devotes more and more of his time for the betterment of mankind, resulting in various scientific discoveries. That is the immortal state of man. This is the use of Rasa which leads towards Rasesh Wara Darshana the philosophy of Jeewanmukti, F. No. 11-B.

F. No. 12. In short we believe that all the luxuries, enjoyable by wealth and by this body are mortal. One should always be devoted to Mukti which is Immortal. Mukti is liberation not at the stage of death but in the living condition and that can be achieved by Gyan, the real knowledge. Gyan can be gained by Abhyas the systematic practice. One can't make such efforts till one is perfectly healthy (Sthirdeha). Thus the sound health of body and mind can be maintained by the use of Rasa and other minerals.

Several experiments are noted in Rasa Shastra books. They have experimented first on metal then on biological units, F. No. 13.

Under their experiments, first they had incinerated vegetables into hot lead then that lead into tin and tin into copper and so into silver, gold and mercury, F. No. 14.

Thus mercury is found to be heavy metal. Hence many experiments are done on this.

In the main, eighteen Sanskaras are known to the Ayurvedic world. An individual chapter is written in Rasahridayatantra as a Awabodha, the gained knowledge, each and every Lohar (metal) was treated by various appliances. For example:

Copper Sulphur
Lead Realgar
Gold Areenic
Iron Cinnbar
Tin Orpiment etc.

These are amalgamated to reduce their melting point and to make the metal brittle.

To prevent after-effects and side-effects they have adopted some specific drugs e.g.
For Mercury—Sulphur
Aconite—Borax.
Marking nut—Coconut Oil etc.

A still more extensive description about the aims and objects of the Rasa Shastra are to be narrated.

In brief it can be said that the aim of Rasa Shastra is Jeevan Mukti under which so many branches are developed viz. Dhatuvada and Dehavada, meaning alchemy and pharmaceutical science etc.

F. T. No. 15

Purification, Shodhan Sanskarao hi Gunantaradhanamuchyate

In Charaka Samhita Viman Sthanam, chapter one, this principal is laid down. For the internal use of any drug obtained from source, we must be cautious enough to avoid its poisonous properties and all such properties which may be the cause of side effects or after effects of any medicine. If the drug is not properly purified and treated well through certain processes, it may be harmful to human beings. Therefore after systematic experiments they evolved methodology based on various factors as Toyasannikarsha, Agnisannikarsha Shaucha, Manthana, Desh, Kala, Vasan and Bhawana etc. . .

(1) By the Toyasannikarsha the drug is treated with water in different manners to convert it into its medicinal form.

(2) By the Agnisannikarsha the drug is treated with fire in many ways so as to convert it into the easily palatable and assimilable form in the body. The Guru (heavy) drug becomes Laghu (light) by this process.

(3) Sauch: Good manufacturing practice is to be observed throughout the process right from the collection of the drug from its origin up to the administration on the human body for enhancing the spiritual and psychological conditions of the patient.

(4) In the Manthana process, the drug is stirred thoroughly by various via medias and converted into an easily swallowable form. The properties of a drug are changed. In curds, which carry the property Abhishyandi—
Srotorodhakara—constrictive and obstructive to the body channels, converts into Takra i.e. buttermilk form, by Manthana, and carries the property Srotahshuddhikara—eliminative and curative.

(5) Desh: The place and the environment play such part in the collection and storage of a drug. If the place is fertile or non-fertile or rocky or salty etc. the effects and the properties of a drug will be different according to the place from where it is collected. In the same way the environment manifests various effects on the properties.

(6) Kola: In the process of various preparations a certain time-factor is necessary i.e. for keeping the drug heating it, placing the medicine into some special environment and regions etc.

(7) Vasan: A prepared medicine or the medicine under preparation, is to be treated with some specific odour, this is called Vasan. Storage is also an aspect under this factor.

(8) Bhavana: To make a drug familiar to another one, inanimate (Acheta) with animate (Chetana) or Ariwarga or purifiers etc. are under this head. For giving various Putas or the incinerations for getting a more potent drug, this process is being done. The juice or the decoction or such other liquids are used with the main drugs by the help of heating or keeping or triturating it to make the drug more homogenous or beneficial in its quality.

By the Samskara, the inanimate drugs are modified so that they may be absorbed into the physiological functioning of the animate, of the animate. This way the Samskara affects the drug by bringing out a change of qualities.

Shodhana is known as pre-operation for manufacturing a drug. The word Shodhana literally means purification. According to the modern system, it is the removal of the foreign materials other than the drug which goes on throughout this process. Such is not the case of Shodhana in Ayurveda. The unwanted qualities of a drug are removed and it will be made eligible for the administration in the body or for carrying out further processes like Maran etc.
For example purified sulphur according to the modern system is cent per cent sulphur having no traces of other drugs. At the same time, it may be harmful by its direct use in the body. The purified sulphur according to Ayurveda will carry better qualities than the purified sulphur of Modern medicine. Moreover, we can administer such a sulphur up to 2 gms. a day, without any side effects. Whereas the pure sulphur of modern science may cause certain types of Pitta disorders. Ayurveda practice believes in the treatment of a patient by the drug as a whole and not by some isolated ingredients, as from nature Dravya carries merits and demerits together in it. The required material is absorbed by the body and unwanted material is excreted. To make the drug more potent, we give Bhawanias of the juice or decoctions of the same drug. This subject is well discussed in Charak Samhita Kalpasthan, chapter 12.

Evolution of various Kalpanas (Medicinal Preparation) Description of Bhasma (Ash, Oxidation, Calcination and Incineration)

Different dosage forms of the drug or formulation have been evolved based upon the psychological treatment so that the same may be more effective. In this way we find 64 methods of preparation viz. expressed juice paste decoction, Oil, Bhasma Parpati, Pottali, Sindoor etc.

The Rasasiddhas followed as systematic study of each and every drug i.e.

(i) To find out the best location a drug.
(ii) To identify a genuine drug, they have given specific names.
(iii) To specify the impurities and adulterations in drug.
(iv) To judge the kind and varieties of a drug.
(v) To gain a proper metal from its ore.
(vi) To find out the incompatabilities of each drug.
(vii) To make the drug palatable and easily disintegrate in the gastro-intestinal tract.
(viii) To prepare the drug in such a state by which the drug may be digested into the body and act with Rasa Rakta Bhaisanar as Kalal form, which can be described as “Colloidal State” in a Bhasma.
A Brief Description of Bhasma

Bhasma literally means, the ash as it is available in Vedic Literature. The metals after purification are powdered and subjected to fire through the media of incenerating material. The out-come is called Bhasma in Ayurveda.

The preparation has been developed since the medieval times. In the Ayurveda texts like Charaka Samhita and Shushutrasamhita we cannot find the method of preparation of Bhasma which is used today. They concentrated mostly on the preparation of drugs of vegetable origin. No doubt that they have made use of metals etc. too. As it has been described earlier, the aim of preparing a Bhasma is to make it easily obserbable in the body. It might be possible that the people of that age were able to digest the metals in their original state or after powdering them. This is merely inference.

The process is described by Agnivesha in Chikitsa Sthan Rasayanadhikar, chapter 1-3/15-23, and 1-4/22 to 26.

These are the references to Lohadi Rasayan and Indrokta Rasayana respectively.

Process: The minerals are prepared into small leaves or powders and then subjected to fire till they reach the red hot stage and are then dipped into the (i) decoctions of Triphala, (ii) urine of cow and (iii) alkaline solutions and ashes of three different herbs successively. By such operations the minerals are converted into a dark black colour and they are made into microfined powders (Sukshma Churna). F. No. 16.

This powder is rubbed with honey and Amalki Swaras (Juice of emblic officinalis) and made into paste, and then kept in a pot which is priorly coated with Ghee. This set is kept in the midst of barley grain for one year. It must be stirred once in a month. Then the Rasayana medicine is ready for administration. This is administred along with honey and Ghee for many diseases or to keep up a healthy physique, as Rasayana.

In the Sushruta, Chikitsa Sthana also we find the same process under the names of Aushadhayaskriti and Mahushdhayaskriti.

The exponents of the Science of Mercury and other metals and minerals, discovered this process in their efforts to
modernding alchecgical techniques. They found them being absorbed in the human bodies more quickly than the direct powders of the metals.

There is a lot of difference between ordinary ash and Bhasma. Ash is the burnt form the vegetable drugs. Bhasma looks like ash. But it has a high potency and capability of curing diseases. The metals will get the potency and good qualities of the drugs of vegetable origin, when tritutated along with the latter.

Method of preparing a Bhasma

(i) Selection of genuine drug Jatya-Tyajya. The extensive description of the physical properties of a drug for the selection of a good drugs for usage is available in the texts.

(ii) Moulding the hard metal into thin leaves and powdering them.

(iii) Trituration along with the drug of vegetable origin or animal origin (Chetana Dravya) Shodhan.

(iv) To give incineration (puta), Marana.

(v) Amriteekarana (giving an ambresial form). This process will avoid the side effects and after effects caused by the administration of a particular Bhasma.

Achievement of the Bhasma Process

The mineral when brought to the form of Bhasma will be desintegrated into microfined form and colloidal state. Thus it can be easier to the body tissue to absorb and deposit the particular mineral on it. When the tissues do not require the same, it can be excreted-out along with the outputs of the body, without causing any damage to the tissues and cannals.

To examine the medicine whether it is up to the standard for its use on human body, some tests are described under.

(1) Varitaratwa; The Bhasma must be floating on the water by putting it from the palm on to the water surface in a limited quantity.
(2) Rekhapoornatwa: The Bhasma must fill in the wrinkles of the fingers when rubbed.

(3) Nischandratwa: The Bhasma must be completely free from the original lustre of the metal.

(4) Nirutthatwa on the test with silver: The Bhasma must not get fixed on the silver rod by heating again.

(5) Apunarbhawatwa: The prescribed quantum of the finished product the Bhasma mixed with Mitrapanchaka i.e. black sugar, borax, abrus precatorious, honey and ghee in equal quantity and subject to fire must not convert it into its original state.

In this way the ancients attempted to lay down certain tests for each and every Kalpana, which are nearby 64 in number. To perform these Kalpanas (formulations) they have adopted nearly 100 types of Yantras (apparatus).

The Comparative outlook of the Administration of Mercury and other Minerals in the Systems of Ayurveda and Allopathy

There are a number of drugs which are common both the Ayurvedic and Allopathic systems of medicine.

According to modern chemistry, Mercury is poisonous and in allopathy, its use is looked upon as dangerous to some physiological functioning such as that of the urinary tract and liver etc. Whereas in our system, it is said that it can become an Ambrosia, followed by proper operations. Inspite of the abundant use of mercury in medicinal form by the Ayurvedic physicians, no side effects or after effects have been come across so far.

Mercury in the form of Ameera Ras (Saddha Bhaishyja Manimala, is useful in the management or sexually transmitted diseases.

The modified form of mercury namely Parpati is well-known remedy in sprue and other gastro-intestinal disorders.

According to Ayurvedic research work, it is proved that the amalgamation equal proportions of mercury and sulphur (Kajjali) will cause laxation whereas the same can be used to stop loose motions if followed by certain operations namely Parpatikalpa. It is used up to 40 to 120 days in increasing and then decreasing doses.
Lead, when administered in modern medicine is a cause of gout, whereas the Ayurvedic preparation of lead in the name of *Naga Bhasma* is useful in the management of gout.

Arsenic compounds in the Ayurvedic methods are useful in the diseases of the respiratory system etc., while these are considered to be dangerous poisons in modern science.

Various calcium sources like pearl, horn of the deer, conch shell, pearl, shell etc., are useful as merely general tonics in the modern system, but the same are used for specific purposes in Ayurveda based on different formulae.

The basic points, according to Rasasastra are viz. giving quicker relief, using in smaller doses, not causing incompatibility etc. These resemble the pharmaceutical principles of modern medicine, F. No. 17.

**Use of the Medicaments prepared with Rasa and other Minerals in certain diseases**

Presented here is some information about the research work carried out in the Jamnagar Institution under the Department of *Rasa Shastr* *Bhaishy* *Kalpana* and Drug Research.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Shwas-Kas</em></td>
<td><em>Somanthi Tamra Bhasma, Shawas Kuthar Ras, Talasindoor, Sameerapannag, Abhrak Satwa Bhasma, Dhatturmool Twak Bhavita Kajjali, Kantakaree Kshara, Manahshila Didhoom.</em></td>
</tr>
<tr>
<td><em>(Respiratory disorders)</em></td>
<td></td>
</tr>
<tr>
<td><em>Pandu</em> <em>(Anaemea)</em></td>
<td><em>Swarnamkshik Bhasma, Swayamagniloha Bhasme, Arogyavardhini Ras.</em></td>
</tr>
<tr>
<td><em>Kushta</em></td>
<td></td>
</tr>
<tr>
<td><em>(Skin disorders)</em></td>
<td><em>Chandmarutha Chenooram, Gandhak Rasayan,</em></td>
</tr>
<tr>
<td><em>Krimi:</em></td>
<td><em>Krimikuthar Ras, Kajjali, Parpati,</em></td>
</tr>
<tr>
<td><em>Diseases of</em></td>
<td><em>Swarnamakshik Bhasma, Sutasekhar Ras,</em></td>
</tr>
</tbody>
</table>
Mahasrotas (G.I.T.)
Phiranga, Upadamsha: Ras Karpoor.
Amlapita: Bhasma of Kapard and Shukti, Loknath Rasa.
Amavata: Sinhanda Guggulu.
Shotha: Silajatu.

Apart from such work, some more work to standardize the Kalpanas (formulations) and remove the controversies in identifying drugs and some work to achieve Rasasanskara are done in this Department. In this way 75 dissertations have been written under this Department since 1958 A.D.
Briefly stated the evolution of Universe (*Loka* or *Jagat*) and also of Man (*Purusha*) according to the *Samkhya* philosophy as accepted in Ayurveda is on these lines:
\[ Avyakt = \text{Unmanifest} = (Prakriti + Purusha) = \text{(Primordial nature + man)} \]

*Mahan* = Understanding, intellect or endowment.

*Ahankar* = Id or Ego.

5 *Mahaabutas* — 5 great proto-elements.

(i) *Akash* — Space or Ether.
(ii) *Vayu* — Kinetic force or Air.
(iii) *Agni* — Thermogenetic element or Fire.
(iv) *Jala* — Soma, Uniting force, or water.
(v) *Prithvi* — Gross Material, *Pudgal* or Earth.

1 *Satwa* or *Mana* — Mind

5 *Gyanendriyas* — Cognitive organs

(i) Hearing
(ii) Touch

Sensory organs of

(iii) Vision
(iv) Taste
(v) Smell

5 *Karmendriyas* — Conative organs

Motor Organs — 2 Hands
2 feet
1 Anus
1 Genitals
1 Organ of speech —
Tongue
Sense objects—*Indriyarthas*

(i) Sound  
(ii) Touch  
(iii) Colour  
(iv) Taste  
(v) Smell

These make a total of 24.

*Man of 24 elements*

From the unmanifest is born the intellect, from the intellect arises the ego. Thereafter from the ego are evolved 5 *Maha-bhutas* or proto-elements etc. in orderly succession.

Thus the whole man, possessed of all 24 elements springs into view and is said to be born.

*Man of 6 elements*

The same man, possessing 24 elements has again been described for the sake of brevity, as composed of six proto-elements only, namely, five *Mahabhutas* proto-elements and one spirit.

*Man of 3 elements*

The Acharyas have further abridged the man as composed of only three elements viz., Mind—(*Satwam*); Soul (*Atma*) and Body (*Sharir*).

Thus, it would appear that the man is a Psycho-somatospiritual complex. The mind and body are considered the seats of diseases, while the pure soul is ever defectless.

In this context, the term Man or *Purusha* denotes the human being, but in reality it embraces all the living beings of all the species. Man is the supreme and greatest in the whole of creation. All other forms of life are made to minister to his wants on earth.

From the genesiological angle, the man is said to be born of the six factors, derived from the *Matru* or mother, father, soul or spirit, concordance, nourishment and mind. (*Matruj, Pitruj, Atmaj, Satmayaj, Rasaj and Satwaj respectively*).
The mother engendered parts (Matrug)

Blood, Flesh, Fat, Umbilicus, Heart, Cloma, Liver, Spleen, Kidneys, Bladder, whole Alimentary canal, Omentum and Mesentery.

From (Father Pitrug)

Hair, Nails, Teeth, Bones, Arteries, Veins, Sinews and Semen.

From Soul or Spirit (Atmag)

The power of being born in different species; life-span, self-awareness, mind, senses, respiration, excretory urge, the powers of directing and substaining various parts, distinctive shape, voice and colour, pleasure and pain, desire and aversion, consciousness, resolution, understanding, recollection, egoism and effort.

From Concordance (Satmyag or Compatibility)

Health, Smartness, undepraved appetite, ideal state of senses, excellence of the voice, virility and sex vigour.

From Nourishment (Rasag)

Differentiation and development of body, invigoration, satisfaction, plumpness and enthusiasm.

From Mind (Satwag)

Inclination, character, purity, hate, recollection, infatuation, liberality, envy, valour, fear, anger, torpor (Tandra). enthusiasm, keenness, softness, profundity (Gambhirya), fickleness (Anavasthitatwam).

Even these parts derived from the mother etc. are in fact modifications of the five Mahabhutas i.e., proto-elements.

The parts derived by men from 5 proto-elements or Mahabhutas

From Akasha

Sound, audition, lightness, fineness, space, all channels of the body.
From Vayu

Tangibility (Sparsha), sense of touch, roughness, impulsion, the differentiation of various tissues, and all voluntary and involuntary movements of the body, respiration etc.

From Agni

Form, vision, brightness, digestion, heat, lustre and colour.

From Jala

Taste, sense of taste, coldness, softness, unctuousness and wetness, all body fluids, fat and mucus etc.

From Pruthvi

Odour, the sense of smell, weight, steadfastness (Sthairyam) and grossness.

From the physiological viewpoint, man is said to be composed of (1) Doshas (2) Dhatus—the body tissues that build the body and (3) Malas—excreta or waste products.

All the above three are again the modifications of the five Mahabhutas—Proto-elements.

The Doshas are of two types viz. (1) Manas or Psychic and (2) Sharira or Somatic.

Rajasa and Tamasa (passion and ignorance) are Manasa the psychic Doshas. They give rise to such disorders as desire, greed, anger, infatuation and a variety of other psychic diseases.

Vata, Pitta and Kapha are three Sharira—somatic Dosas. These are derived from five Mahabhutas as follows :

Vayu and Akasha give rise to Vata.
Agni and Jala ,, ,, Pitta.
Jala and Prithvi ,, ,, Kapha.

It is to be understood here that when these three are in normal states and support the body, they are called Dhatus; when they vitiate the body, then Dosas; and when they are in waste form, they are called Malas.
The Properties of Vata

*Vata* is said to be dry, cold, light, subtle, unstable, clear, rough and hard.

Functions of Vata

Animation, respiration, all voluntary and involuntary body movements, regular circulation of body-elements and fluids, regular elimination and excretions. *Vata* is the conducting (*Yogovahi*) par excellence and performs all the life activities.

To facilitate the understanding of the functions of *Vata* in different regions of the body, *Vata*, though one, has been grossly classified under five groups i.e., *Prana, Udana, Samana, Vyana* and *Apana*.

The *Prana Vata*

With its abode in the head moves downwards into the chest, through the gullet, supports the mind, the intellect, the sense organs and the heart, and does the functions like, spitting, sneezing, inspiration, deglutition and eructations.

The *Udana Vata*

With its seat in the chest it has its range of activity from nose above, to the umbilicus below. It inducts in the person, speech, perseverance, vigour, strength, memory and brightness of the skin.

*Vyana Vata*

The *Vyana Vata* moves through whole of the body and is responsible for all the voluntary and involuntary movements of the body.

*Samana Vata*

Staying by the side of *Pachak Pitta* it moves through whole of the gastro-intestinal tract and by its discretionary power retains food till it gets digested, helps digestion and propels the food down.
Apana Vata

It has its abode at the anus, moves in the pelvis, thighs and genito-urinary organs and does all evacuatory functions like defecation, micturition, seminal ejaculation, menstruation and foetal expulsion.

Properties of Pitta

The Pitta is slightly unctuous, hot, acute, fluid, acid, mobile and pungent.

The functions of normal Pitta are:
Vision, digestion, body heat, hunger, thirst, softness of the body, lustre, cleanliness of mind, intelligence and health.

This Pitta is of five types according to the locations and functions.

Panchak Pitta

Located in the region between stomach and the beginning of the large intestines this Pitta digests the food, has the dominance of Tego Mahabhut, separates the essence of food from the waste material and favours replenishment of the other four pittas of the body. The process of digestion goes on in the gastro-intestinal tract and up to the tissue and cell level.

Ranjaka Pitta

The Pitta situated in the stomach, liver and spleen is called Ranjaka as it helps colouration of Rasadhatu—chyle, to become Rakta or Blood.

Sadhaka Pitta

The Pitta contained in Hridaya or mind achieves the wishes of the individual, by virtue of the higher mental functions like intellect, memory and self-respect or awareness.

Alochak Pitta

The Pitta located in the eyes is responsible for vision.

Bhrajaka

The Pitta located in the skin, illuminates and irradiates the
lustre of the skin. It absorbs certain materials applied over the skin. The Pitta and Agnis, for all the practical purposes, are one and the same. In Charaka Samhita a very beautiful description of Agnis has been given.


The Jatharagni or Pachkagni or Kayagni as it is called sometimes is in the digestive tract and produces Ahara-Rasa-Lymph-Chyle.

This Rasa gets mixed with the pre-existing Rasa-dhatu after having been acted upon by the Rasa-Dhatu-agni.

According to Ayurveda by the action of successive Dhatu-agnis (Tissue Agnis) the successive seven Dhatus (Tissue or tissue nutrients) are born and replenished continuously.

The Jatharagni also sends moitus to support the other Agnis. The Jatharagni is supreme and all powerful.

The five Bhutagnis, aided by Jatharagnis digest their respective Bhutamshas, e.g., parthiva part of the food by parthiva-agni, the Apya of the food by Apagni and so on, to make their alien and foreign food constituents reduce into the constituents having akin, native and agreeable properties in order to make them fit for building up the various tissues by the process of synthesis. In this process all the food materials and the constituents continue to remain Panchbhautik (made of five elements) even after having been acted upon by “Bhutagnis”. But after the action of Bhutagnis, unique properties are born which are no more foreign and alien to body tissues. When these Agnis or digesting factors fail, there are many intermediate, undesirable, improperly digested and disagreeable food products in the body which give rise to the diseased states. All undesirable and improperly digested materials are designated by the term “Aam” unripe.

The Properties of Kapha

Kapha is heavy, cold, soft, unctuous, sweet, stable, viscid and white.
The functions of normal Kapha are:
Causing viscousness, cohesion, firmness, heaviness, potency, strength, forgiveness, fortitude and greedlessness.

This Kapha is also of five types:

1. Kledak Kapha: This Kayha located in the stomach moisturises the food and helps in its disintegration and favours replenishment of the remaining types of Kapha.

2. Avalambak Kapha: This Kapha located in the chest, protects the Trika Sandhi—(The joints of arms, neck and sternum of/and sacrum) and supports the heart with the help of Anna Rasa—lymph—chyle derived from the food and from its own intrinsic potency.

3. Bodhak Kapha: This Kapha situated in the throat and at the root of the tongue makes the tongue capable of the perception of tastes.

4. Tarpak Kapha: The Kapha situated in the head gratifies and bathes the different sense-organs, in virtue of its natural humid attributes.

5. Shilaishmic Kapha: This Kapha situated in the joints keeps them firmly united; protects their articulation and opposes their separation and disunion.

Dhatus—Tissues

Those which build, support and maintain the body are called Dhatus—Tissues. They are seven in number.

1. Rasa or the lymph-chyle exercises a soothing effect upon the entire organism and tends to contribute to the increased formation of blood.

2. Rakta or Blood in its turn increases the healthful glow of the complexion, leads to the increased formation of flesh and muscles and maintains vitality in the organism.

3. Mansa or Flesh contributes to the stoutnets or rotundity of the limbs and contributes to the increased formation of Medo Dhatu or fat.

4. Medo Dhatu or Fat gives rise to glossiness of the body and primarily contributes towards the firmness and growth of the bones.

5. Asthi Dhatu or bones supports the body and contributes to the formation of Majja Dhatu or marrow.
(6) The Majja Dhatu or marrow contributes towards the formation and increase of semen and fills the internal cavities of the bones and forms the chief source of strength, amorous feelings and hilarity.

(7) Shukra Dhatu or Semen gives rise to valour and courage, makes a man amorously disposed towards the opposite sex, increases strength and amatory tendencies, is the sole impregnating principal in man.

Upadhatus

Dhatus also give rise and nourish some of the structures which are very akin to Dhatus. These structures or substances are designated as Upadhatus. The following table shows the origin of various Upadhatus:

<table>
<thead>
<tr>
<th>Name of Dhatus</th>
<th>Name of Upadhatus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rasadhatu</td>
<td>Gives rise to breast milk (Stanyam) and Menstrual blood. (Arthavam)</td>
</tr>
<tr>
<td>Raktadhatu</td>
<td>Tendons and Vessels</td>
</tr>
<tr>
<td>Mansadhatu</td>
<td>Muscular fat and six layers of Skin.</td>
</tr>
<tr>
<td>Medodhatu</td>
<td>Sinews.</td>
</tr>
<tr>
<td>(Adipose tissue)</td>
<td></td>
</tr>
</tbody>
</table>

These Upadhatus are very important structures and substances of the body which subserve various functions of the body.

Malas or Excretory Matter

Malas are impure or waste materials of the body which are hurtful if retained. These are excreta issuing outwards from the body orifices in various forms—Putrescent Dhatus, vitiated Doshas and all those which prove harmful to the body.

In main there are three Malas—foeces, urine, and sweat.

Foeces and urine are the Malas of food. The Kapha (mucus like) is the mala of Rasadhatu. The Pitta is the Mala of Raktadhatu. The excretions of the body orifices are the Malas of Mansa Dhatu.
The sweat of the body is the Malas of Meda Dhatu.  
The hair and nails are the Malas of Asthi Dhatu.  
The oily substances in eye, feces and skin are Malas of Majjadhatu.

Ojas

Besides the above mentioned Doshas, Dhatus, Upadhatus and Malas, there is a concept of a substance, known as Ojas. This substance is said to be the very essence of all the seven Dhatus. This is very vital and essential for the existence of life. Even the Doshas in absolute equilibrium fail to bear the body if devoid of Ojas. The diseases and infections lose their virility and intensity in a person possessed of Ojas.

Constitution or constitutional Disposition—Habitus

Prakriti

The child is said to derive its constitutional disposition according to a Dosha or a number of Dosha that remain predominant and powerful in its physiological state at the time of the fertilisation of the ovum.

The consolidated micro-imprint of various physiologically active Doshas with a relative dominance of any one or more of them is drawn from different factors viz., nature of sperm and ovum, the time and season of cohabitation, the nature and condition of the uterus, the conduct, habits and diet of the mother and the state of primordial elements and their modifications at the time of fertilisation. In the opinion of most of the Acharyas all these factors influence the constitution of the zygote by influencing the sperms and ovum. Thus with permutations and combinations of the three Doshas seven types of somatic constitutions or builtis have been described: (1) Vataj (2) Pittaj (3) Kaphaj (4) Vatpittaj (5) Vatkaphaj (6) Pittakaphaj and (7) Sannipataj. However, the disposition may vary from time to time, from the individuality, heredity, the nationality, the race, the land, and with the variations in seasons, age and strength.

The people having Vatik constitution are generally of small strength, have short life span, small number of children and
are of meagre wealth. They suffer from insomnia, ill temperament, maldeeds, incoherent talks and roaming character. They have rough, fissured hands and feet, excessive rough hairs and nails, and often exhibit nail-bitting.

The people having Pittaj constitution are of moderate strength and lifespan, possess good knowledge, experience, wealth and means. The thermogenic nature produces excessive fetid perspiration with yellowish discoloration of various parts of the body. Premature grey hair sometimes with baldness and folds of skin at various places are also seen at an early age.

Persons of Kaphaj constitution are possessed of strength, wealth, knowledge, vitality, endurance and gratitude. They have virtuous drives, relish sweet substances, have a commanding voice and are handsome to look at.

The constitution has also been detailed according to the five Mahabhutas or Proto-elements.

By combinations and permutations the constitutions are in finite in number.

**Psychic Constitution**

These, in main are of three types (1) Satwik (2) Rajasika and (3) Tamsik.

The persons of Satwik constitution have the following characteristics:—

Absence of hostile propensities, judicious distribution of the belongings amongst the fellow members, forbearance, truthfulness, piety, a belief in god, spiritual knowledge, intellect and good retentive memory, comprehension and the doing of good deeds irrespective of consequences. These are again of seven kinds or of infinite kinds.

**People of Rajasika Constitution**

Feeling of much pain and misery, a roving spirit, non-comprehension, vanity, untruthfulness, non-clemency, pride, an over-weaning confidence in one’s own excellence, lust, anger and hilarity are the attributes of the Rajasika cast.

These are again of six kinds or infinite kinds.
People of Tamasika Constitution

Despondency, disbelief in the existence of God, impiety, stupification, perversity of intellect, lethargy in action and sleepiness are the qualities of a Tamsik stamp. These are again of three kinds or of infinite kinds.
When discussing the theory of various Darshanas, it is not easy to grasp very accurately the meaning of their terminologies. There are several theories to explain the constitution of matter. Every prominent school of Indian Philosophy has dealt with this and the Ayurvedic Seers (Rishis) were also influenced by it in turn influencing others also in their quest for Truth-Reality. Modern medical science stands on a tripod of physics, chemistry and biology. The Ayurvedic ‘Seers’ of hoary past similarly took from other branches of knowledge which were devoted to the study of the world of experience which surrounds us. Thus one finds, in the works of the great Rishis of Ayurveda viz. Charaka, Shushruta, Kashyapa, Bhela, etc. all of which were written before the beginning of the Christian era, discussions on biology, the theory of matter, cosmology, psychology, philosophy and so on. Later works have been silent on these topics and have paid more attention to the topics of medicine.

A modern medical man will naturally ask why this sort of discussion in a book of medicine? Our reply is that Metaphysical and philosophical discussions are there, because the Acharyas of Ayurveda believed that the aim of Ayurveda was to cure a person not only of his mental and bodily ailments but, also to relieve him of his bondage from the material world and to show him the path of true salvation or Moksha. If dyspepsia and dementia are physical and mental disorders, the cycle of birth and death is most certainly a spiritual disorder. This is evident from the description of Charaka Samhita Sutrasthana Chapter, 1st and 11th where a desire for long life to attain the four Purusharthas, Dharma, Artha, Kama and Moksha and the three Eshanas, Pranaisana, Dhanaisana
and Paralokaisana have been discussed. If the works of the Seers (Rishis) are studied from this view, it will be easy to grasp and admire their ideology. The human personality according to Ayurveda is made up of Sattva (mind), Atma (Soul) and Sharira (Body or matter) and therefore, a medical student ought to be acquainted with all the three. This they preached and preached more than once. Matter thus came-up for repeated studies and its Panchabhautic constitution merited their deep consideration.

The late Sir Brajendra Nath Seal, in his ‘Positive Sciences of the Ancient Hindus’ observes that long before the first century A.D., the prevailing schools of medicine and surgery which were based on the Sankhya teaching with a methodology derived from the Nyayavaisheshika doctrine (CF. Charaka Sutra and Sharira Sthana Chapter 1, Vimana Sthana Chapter VIII also Sushruta Sharira Sthana Chapter 1) had founded an elaborate theory of inorganic and organic compounds which equally admitted Iso-Bhaautic and hetero Bhaautic combinations. Like the Vedantists, Charaka held that each of the gross Bhutas (Maha Bhutas) is a peculiar ultra-chemical compound of fine original Subtle Bhutas. In this sense every substance is penta-Bhaautic, but for the purpose of chemical analysis and synthesis i.e. considered with reference to the Mahabhutas, all substances in their chemical constitution belong to one or other of the following classes: Mono-Bhaautic, Bi-Bhaautic, Tri-Bhaautic, Tera-Bhaautic and Penta-Bhaautic—compounds of different Bhutas: again these may combine to form more complex substances, and these in their turn, higher compounds still, and so on in progressive transformation, as is more specially the case with organic substances and products.

Charaka has said whatever substances one finds in the universe or cosmos are found in the body. This means that there is no difference in quality between the Macrocosm and the Microcosm except one of degree. To understand the body properly therefore, one should study the physical constitution of the Universe. One is not in a position to tell you how much has been given to and taken from the Samkhyas, Yogas, Naiyaikas, Vaisheshikas and Vedantists by the Rishis of Ayurveda. But one does know that there exists a firm philosophical background to the doctrine of Ayurveda which cannot be
easily understood without having a good grasp of the related Darshanas.

From the Vedic times, the Aryan thinkers began to discuss the problems of the origin and nature of the world. The famous ‘Nasadiya Sukta’ (Hymn) contains the most advanced theory of creation. Look at its boldest speculations, which bring the mystery of Creation. Who then knows, who has declared it here from whence was born this creation? The Gods came later than this creation, who then knows whence it arose? He, from whom this creation arose, whether He made it or did not make it, the highest seer in the highest heaven He forsooth knows, or does even He not know? During the times of the Upanishadas, there were two schools of Upanishadas, there were two schools of thought. The first regarded Brahma as the only truth and ultimately developed into the Monastic Vedanta of Sankara (Advaitavada), whereas the second one, accepting the reality of the world, postulated a dualism (Dvaityavada) which developed into Samkhya Philosophy. The Nyaya-Vaisheshika schools have also discussed the question of creation and have elaborated an atomic theory (Paramanuvada) which had its seeds in the Upanishadas. These three schools of thought have described their theories under the three Vadas viz. Vivarta Vada, Parinama Vada and Arambha Vada respectively.

We come across the views of other thinkers also regarding the creation of this universe and its various phenomena such as Shunya Vada of Madhyamikas, Sanghata Vada of Vaisheshikas, Kshonika Vada of Sautrantikas, Vijnana Vada of Yogachara Baudhas, Shyad Vada of Jainas and Swabhava Vada of Charavakas. All these various thoughts have influenced the literature of Ayurveda. This is evident from the description of the various Parishads that were held from time to time under the presidency of Punarvavashu Atreya. In Charaka Samhita Sutrasthana alone we get the views of Parinama Vada of Samkhya and Arambha Vada of Nyaya Vaisheshika. Besides, we come across the description of Swabhava Vada of Bharadvaja, Paranirmana Vada and Aima Vada of Pariksi Maudgalaya, Sattva Vada of Saraloma, Rasa Vada or Tridhatu Vada of Varyovida, Shad-Dhatu Vada of Hiranyksa Kusika, Parampara Vada of Kaushika, Karma Vada of Bhadra Kapya,
Prajapati Vada of Kankayana Bahlaka Bhishaka and Kala Vada of Bhiksuratreya in chapter Yajjahpurshiya. In chapter 25th of Sutra Sthana you get the quotation of Yadrichha Vada and Niyati Vada etc. 4

Charaka’s views on the formation of a new quality of a new substance is based on the Samkhya teaching as to the conservation and transformation of energy, and brings chemical synthesis in line with evolutionary change (Parinama). Based on this view, a new substance may arise by spontaneous or isomeric change, i.e. by the interplay of energies within the system of any given substance in the absence of any action from without. New qualities like new substance are only readjustments of the old and continual changes are going on by spontaneous disintegration and recombination.

Opposed to this evolutilional view of chemical synthesis is the Nyaya Vaishesika doctrine of Arambha Vada, according to which no change of substance or quality, no effect, in short, can take place except by the action of one component element (substance or quality) on another binary molecule for example, cannot possess and “Specific quality” (Vishesha guna) of a kind not represented in each of the two component atoms. In the cosmic process no atom can exist free and uncombined with another atom and every ‘Specific quality’ in a substance can be ultimately analysed into the union of two ‘specific qualities’ of the same class in the ultimate particles which cannot be further divided. A single colour, smell or taste in a single particles, cannot characterise any substance formed by the union of these particles as material causes. Hence an Earth-atom cannot unite with an AP-atom to form a new substance of which both the particles must be regarded equally as material causes. At any rate, such a compound, if effected, would be odour-less, as of the two constituent atoms only one, viz. the Earth-atom possesses smell. A compound of Earth and Vayu would be Odour-less, colourless and tasteless, and so on. The Nyaya Vaisheshika does not deny that there may be compounds of different Bhutas nor does it deny the causal operation of specific qualities as efficient energising (dynamic) causes (Upashtambhaka or Nimitta karana), but it refuses to place these compounds on the same footing as compounds of isomeric modes of the same Bhutas,
and it accepts the ‘Material’ casualty in such cases of only one of the Bhutas, regarding the others as co-efficients. (Nimitta Karana).

The earlier Samkhyas including the medical school of ancient India brushed all these aside as a distinction without a difference. The Vedantists, as we shall presently see, flouted the doctrine of Arambha Vada. The Jainas, in opposing this Vaisheshika view of atomic combination, hit upon a solution of the problem of chemical affinity. Others again, found out a via-media. They held as we learn from the reports of Udyotakara in the Nyaya-vartika, and of Vachaspati Mishra in the Tatparyatika that a molecule of the structure E.A. (One atom of Earth and one of A.P.) would exhibit some variety of colour and taste resulting from the joint action of the atoms and of their several colours and the atoms and of their several colours and tastes. But as in the combination of EA only the Earth-atom possesses smell, and the Ap-atom is odourless and as moreover no quality in a compound substance can result except from the joint action of the similar (potential) qualities of at least two component elements, it follows that a molecule of the structure E.A. would not manifest the energy of smell potentially contained in the Earth atom. Hence, admitting the combination E and A for an odour-less compound, the upholders of this view would suppose a molecule of the type E2 A (i.e. two atoms of earth and one of AP) to explain any bi-Bhautic compound of Earth and AP (like the plant saps and fruit juices) which exhibits smell in addition to the peculiarities of colour and taste (CF. Vachaspatis comment on Udyotakar’s refutation of this view).^5

The Vedantists believe Maya to be the ‘material cause’ (Upadana karana) of the world. The power of Maya is the power to realise the unreal to impart practical reality or mediate existence to that which does not and cannot possess absolute Reality or self-existence. Maya is at once real and unreal, while the Brahma (self) is absolute Reality, absolute Intelligence, and absolute Bliss. The world evolves out of Maya (Maya Parinama) so that Maya in Vedanta replaces the Prakriti of the Sankhya. But, Maya and by implication the world, originate out of Brahma, not by a process of
evolution (*Prinama*), but of *Vivarta* (Self-alienation). The alienation of the Absolute, acting through *Maya*, produces in the beginning *Akasha* one, infinite, ubiquitous, imponderable, inert and all-pervasive. The world thus begun goes on evolving in increasing complexity. The other *Sukshma Bhutas*, classes of subtle matter, evolve from *Akasha* in an ascending linear order—*Akasha* giving off *Vayu*, *Vayu* giving off *Tejas*, *Tejas* giving *Ap* and *Ap* giving of *Prithvi* (Earth). *Akasha* (one, infinite, all pervasive) has the capacity of sound, *Vayu* (subtle gaseous matter) emanates from the universal *Akasha*, and is instinct with the potential of mechanical energy (impact, pressure). *Tejas* (subtle radiant matter) emanates from *Vayu* and contains in potential the energy of light and heat. *Ap* (subtle Viscous matter) is the transformation of *Tejas* and is instinct with energy that stimulates the nerve of taste and lastly *Prithvi* or Earth (subtle hard matter), which is the transformation of *Ap* possesses the latent energy of smell.⁶

But the subtle radients of matter must be compounded in various ways to give rise to the gross constituent matter of the world. These forms of Gross-matter are called *Mahabhutas*.

Buddhism recognises four essentials of matter viz. extension with hardness, cohesion with fluidity, heat and pressure with motion and four sensibles viz. colour, taste, smell and touch. The later Vaibshashikas hold that the *Vayu* atoms are touch sensibles, having an impact or pressure for their characteristic property and by aggregation from the *Tejas Bhutas*, the atoms are taste, colour and touch sensibles with a characteristic viscosity, and from the *Ap*-element by aggregation; and finally, the Earth-atoms are smell, taste, colour and touch sensibles possessing a characteristic dryness or roughness, and by their aggregation from the Earth-element. The *Bhutas* thus originated combine to forma aggregates which are classed as inorganic substances, organisms and organs. *Baudhas* are *Ekantavadis*, who believe that everything in this universe is Anitya (Non-existing), Kshanika (Momentary), *Dukkha* (troublesome) coming out of *Shunya* by aggregation *Samghata*. They believe in *Tsatkhya* (Absolute non-existence).⁸
Jains believe in *Anekanta Vada* (Uncertainty) and therefore they are called *Syada Vada*. *Syada Vada* is an assertion of possibility or non-possibility, the sceptical or agnostic doctrine of the Jainas, that of *Ajiva* (the none soul or non-Ego) consists of the five entities, four of which are immaterial (*Amurta*) viz. merit, demerit, space and time, and the fifth material (*Murtta*). This last is called *Pudgala* (Matter) and this alone is the vehicle of Energy, which is essentially kinetic i.e. of the nature of motion. Everything in the world of not-soul (the non-Ego) is either an entity (*Dravya*) or a change of state (*Paryaya*). *Pudgala* (matter) and its changes of state (*Paryaya*), whether of the nature of subtle motion (*Parisparam*) or of the evolution (*Parinam*), must furnish the physical as opposed to the metaphysical basis of all our explanations of nature. *Pudgala* exists in two forms *Anu* (Atom) and *Skandha* (Aggregate). The Jainas begin with an absolutely homogeneous mass of *Pudgalas* which by differentiation (*Bhedas*) breaks-up into several kinds of atoms qualitatively determined, and by differentiation, integration and differentiation in the integrates (*Sanghat Bhedat, Samghatabhedat*), forms aggregate (*Skandhas*). An *Anu* is not only infinitesimal but also eternal and ultimate. A *Skandha* may vary from a binary aggregate (*Drayanuka*) to ad infinitum (*Anantanuka*). *Abinana Skanaha* is an aggregate of two *Anus* (Atoms), a tertiary, Skandha is formed by the addition of an atom (*Anu*) to the binary (*Drayanuka*) and so on ad infinitum. The ascending grades are (1) what can be numbered (*Sankheya*), (2) indefinitely large (*Asankheya*), (3) infinity of the first order (*Ananta*), (4) infinity of the 2nd order (*Anantanata*) and so on.\(^9\)

Charvaka was a materialistic philosopher. The Charvakas whose doctrines are embodied in *Bhraspatya Sutras*. They—the Charvakas believe that there is nothing like *Upadana-Karana* for the creation of the universe and or any Karya. It is a natural phenomenon that if earth, water and seeds are put together in a harmonious way, the seeds sprout without the help of any creator. They are called *Swabhava-Vadis*.\(^10\) The Charvakas (Materialists and Sensationalists) answer that life (as well as consciousness) is a result of peculiar chemical combination of dead matter (or the four elements) in organic forms, even as the intoxicating property of spiritus liquors
result from the fermentation of unintoxicating rice and molasses. Similarly the instinctive movements and expressions of new-born babies (sucking, joy, grief, fear etc.) can be explained mechanically as due to external stimuli as much as the opening and closing of the lotus and other flowers at different hours of the day (or night) or the movement of iron under the influence of loadstone. In the same way, the spontaneous generation of living organisms is frequently observed, e.g., the case of animalcules which develop in moisture or infusions, especially under the influence of gentle warmth (Swedhja, Ushmaja, Danusmashkah) or of the maggots or other worms which in the rainy season, by reason of the atmospheric moisture, are developed in the constituent particles of curds and the like, which begin to live and move in so short a time.

Atma-Vada of Pariksi Maudgalya

Pariksi Maudgalya having considered the question raised by King Yamaka of Kashi said "Man is born of the spirit (Atma), likewise all the diseases are born of the spirit. For the spirit is the source of everything. It is the spirit (Atma) that acquires and enjoys the merits of actions and their fruits respectively, for in the absence of the element of consciousness there is no activity either pleasurable or painful", (Ch. Sut. 25). Here it is obvious that in the Atma Vada of Maudgalya, the Atma is not Udashina, but he is supposed to be Karana, Karta, Jnata and Bhokta. This aspect of the description of Atma has been discussed in Charaka Sharira Chapter 1 also. There it is said that "If there were no Purusha (Atma) there would be no embodiment, no pleasure and pain, no coming and going, no speech, no sciences, no sulphure, no birth-death, no bondage and no liberation. Therefore the knowers of Causation have declared the Purusha to be the cause. For if the Spirit (Atma) is not the cause, then light etc. would become causeless; nor can any knowledge of these things arise nor will they serve any purpose etc." The science of creation of Atmanavadin is based on 24 Tatvas. Their contention is that the Karma purusha is made up of 24 Tatvas. Charaka says "Again, in consequence
of the elemental modification, *Purusha* (Man) is said to be composed of 24 *Tatvas* viz. the mind, the ten organs (five cognative and five conative) the five sense objects and the eightfold Prakriti or evolutes of nature."

On the basis of the above, the *Atmavadis* says—"However Purusha, the self is seen to be the cause according to all forms of testimony including scripture, whereby the knowledge is tested and recognised."

**Sattavamda of Saraloma**

But the sage Saraloma intervening at this stage in the debate said: "No, this is not so; for surely the Spirit (Atma) seeing that it dislikes pain, would never yoke itself of its own according to disease which cause pain. The real cause of the origin, both of the body and its afflictions, is the mind, known as 'Sattva', when it is enveloped by passion and ignorance (Rajas and Tamas)." From this it seems that *Sattva Vadi* though it accepts the existence of *Atma* still does not hold the view that *Atma* is *Karta* as he believes *Atma* to be *Udasa*na. Thus *Sattva Vadi* Saraloma is of opinion that *Atma* and *Sattva* (mind) both are *Anadi*. We come across the description of 'Manas' in *Yoga Vashishta*, to be ultimate reality and all pleasure and pain to be due to this *Manas Sattva*.

**Rasavada and Tridhatuvada of Varyovida**

Varyovida contradicts the view of Saraloma and says—"No, this too is not right. For the mind by itself cannot be the cause of anything". Thus without the body there cannot, of course be any disease of the body nor for that matter the mind's very existence. All creatures are born out of the *Rasa* (the fluid pertaining to the embryonic and foetal life). So also the various kinds of diseases. The proto-element water indeed is the basis of all fluid and it is described to be the cause of their manifestation. *Varyovida* is of the opinion that the very existence of mind cannot be established without the body as the mind resides in the body and there cannot be any disease without the body. Thus accepting the existence-
of the *Atmavada* of Maudgalya and *Sattva Vada* of Saraloma, Varyovida gives more importance to the body which is born out of Rasa (Fluid). Here, the *Tridhatu Vada* of Ayurveda i.e. "the mind, the spirit and the body were together as it were the tripod, the world endures by reason of cohesion, and on that are all things established". That aggregate of the mind, spirit and body is man, he is the conscious agent. He is regarded as the subject matter of this science, has been promulgated,\(^{19}\) is implicitly established. In his above statement Varyovida holds the view that when the abode of mind is body, and there cannot be any bodily disease without body though the mental diseases are off shoots of disturbances of mind or mental *Doshas*, it is desirable to accept the body to be the cause of even man and bodily as well as mental diseases. We will discuss this in detail along with *Duilokapakshiya* and *Panchlokapakshiya* opinions on it while discussing *Tridosha Sidhanta*.

**Shad-Dhatu Vada of Hirnyaksa Kushika**

On hearing the views of Varyovida, the Sage—Hiranyaksha said—"No, for the Spirit (Atma) is not said to be born of Rasas, nor even the mind which is supersensual. Besides, there are diseases which spring from sound etc. i.e. from the *Hina Mithya* and *Atiyogas* of the objects of the sense-organs. Man, then, is the result of the six elements. The disease, too, arises from six elements". Thus the individual was declared to be the aggregate resulting from the union of the six elements (five proto-elements and consciousness) by *Adi-sankhyas*.\(^ {20}\)

This view of *Shad-Dhatu Vada* has been supported at many places in Ayurvedic texts. In *Charaka Sharira* Chap. 1, we read that "Man is said to be the sum of the six, the sixth being the element of consciousness.\(^ {21}\) Again in the 4th chapter—"looked at from this stand point the embryo is the sum of the modification occasioned in the proto-elements and is the resort of the spirit (Chetana), thus the spirit has been said to be the sixth element of the embryo."\(^ {22}\) In Susrutra also we find the description of Purusha in similar terms—"In Ayurveda, the Purusha, the self conscious organic individual
is described as the resultant of the combination of the soul and the five proto-elements (Primary material principles)."\(^{23}\)

**Paramapara Vada of Kaushika**

The sage Kaushika refutes the statement of Kaushika by saying—"No, that is not so. How can the individual spring from the six elements without the agency of the father and mother. Thus man is born of man, bull of bull, horse of horse, and so on. Thus diseases such as the urinary one and others have been said to be hereditary. Therefore the parents are origin both of the individual and his diseases."\(^{24}\) These *Paramapara Vadis* were staunch Nastikas. Even *Swabhavadis* and *Yadrichha vadis* have contradicted the view of *Paramapara Vadis*. This will be evident when we discuss the views of Bharadvaja-a *Swabha-Vadi* later on. There was a *Paramapara Vada* among *Astikas* also who believed in geneology from Brahma, they are called ‘Budhipurvaksarga Vadis’.

**Karmavada of Bhadra Kapya**

Bhadra Kapya contradicted the views of Kaushika and said—"No, for the blind are not born of the blind nor, can you account on your thesis for the origin of the first parents. Therefore a creature is said to be born of the merits of action and from merits of action also arise the disease afflicting him. In the absence of action, there is no rise either of man or of disease". We come across two types of *Karmavadas* one is called *Akrita Karmavada* and the other is called *Krita Karmavada*. From this description, Bhadra Kapya seems to have been a believer of *Akrita Karma Vada*. This is apparent from the contradiction of his view by Bharadvaja. But we find a better description of *Krit Karma Vada* in Ayurvedic text. Refer to the chapter 11 of Sutra Sthana and Chapter 2 of *Sharira Sthana of Charaka Samhita* where *Karma, Karmaphala* and *Punarbhava* (actions, result of actions and re-birth theory) have been discussed in detail.

**Swabhava Vada of Bharadvaja**

Bharadvaja refuting the views of *Karmavada’s* said—"No, for the doer precedes the deed, nor have we any valid
knowledge of action that has not been performed, whereof it may be said that an individual is the result. Nature alone is the cause, then, of both man and his diseases. Just as roughness, fluidity, mobility and heat are respectively the nature of earth, water, air and fire,” Bharadvaja while contradicting the views of Karmavada of Bhadrakapya has cleverly taken the basis of Krita Karma Vada when he mentions that the doer always precedes the deed. One way be sure this view of Krita Karma Vada ‘he has undertaken only to refute the views of Akrit Karma Vada’ of Bhadrakapya. Bharadvaja never believed in Karma Vada. He believed in Swabhava Vada. This Swabhava Vada. Bharadvaja has been the originator of ‘Panchatmakaloka paksiya’ branch of Ayurveda. This view was once very popular. This is evident from the description of the Charaka Sutrassthana, Chapter 26 the Atreya Bhadra Kapya Adhyaya—where Bharadvaja known also as Kumarashira has said—“There are five Rasas only, those that pertain to Earth, Water, Fire, Air and ether.” Similarly in Sharira Sthana, while describing the Garbha Sharira etc. Bharadvaja has said—“the embryo is a compound product of the ethers, air, fire, water and earth proto-elements and is the dwelling place of the Spirit” (Ch-Sharira-4). Again—“The body here means, the vehicle of equilibrium, being the dwelling place of consciousness and comprising the sum of modifications of the five great elements (Mahabutas)” (Ch. Sha. Ch. 6). According to Swabhava Vada of Bharadvaja, the word Chetanandhithana Bhutam in these contexts means the abode of Chetana or the dwelling place of Chetana or spirit (Aima). He believes that Chetana and Manas are synonyms and are natural offshoots of the combination of Panchamaha bhutas. Not only this, he has also said that “from among the senses, the sense of touch pervades all the others and thus the mind inherent in it for the field of this mind is co-extensive with that of the tactile sense” (Ch. Sut. 11). Here he has clearly mentioned that the Sparsendriya (tactile sense) is ‘Chetan-Sumavayi’ i.e. the tactile sense is the Samavayi Karana of chetana. Again we come across the view of Bharadvaja in Sharira Sthana when he, contradicting the other’s views says—“Neither mother, nor father, neither the spirit, nor concordance, nor yet the use of drinks, of foods that are eaten, masticated or
licked up, in fact bring about conception. Nor a mind coming from another world enter into the embryo, etc. All these descriptions implicitly support, the *Swabhava Vada* of Bharadwaja.

**Prajapati Vada of Kankayana**

Kankayan contradicts the *Swabhava-Vada* by saying— "No, for then, efforts would be fruitless, and things would either be accomplished or not accomplished simply by the course of nature. So it is the lord or creatures, the son of Brahma, possessed of infinite imagination, that is the creator of the universe both animate and inanimate, and of both pleasure and pain". Kankayana seems to have been a *Karita Karma Vadi*. His contention was that in any condition there cannot be any action without the actor. Similarly there should be one who would reap the consequence of his deeds and therefore he pre-supposes a son of Brahma-Prajapati with an infinite imagination (*Amita-Sankalpa*) i.e. the Creator of the Universe. The *Prajapati Vada* of Kankayana, the *Bhahlika Bhishuk* is traceable in Vedic literature also (*Yajurveda* Ch. 8-16).

**Kala Vada of Bhikshu Atreya**

Bhikshu Atreya could not agree with the views of Kankayana and said— "No, that is not so. For surely the lord of creatures would never consign his children, whose welfare he always seeks, to suffering like a malevolent person. Therefore man is an evolute of time, and man’s ailments likewise are born of time. The whole world is under the suzerainty of time and is the evolvent everywhere". This view of *Kala Vada* has been supported at many places in the texts of Ayurveda.

Addressing the sages who were thus disputing, the worshipful Punarvasu Atrya gave utterance thus. "Truth is hard to find by taking sides in a debate. Those who advance arguments and counter-arguments as if they were finalities, never in fact arrive at any conclusion, going round and round like the man who sits on the oilpress. Therefore, letting go this wordy warfare, apply your mind to the essential truth, but without dispersing the obscuring cloud of passion, there can be on
proper appreciation of the object that is to be known. Now let me put before you the true cause. It is the very elements whose wholesome combinations give rise to the well being of man that bring out, in their unwholesome combinations, various kinds of diseases”.35

The above gives an idea of some discussions which were held under the presidentship of Bhagwan Punarvasu Atreya regarding the origin of Purusa and his ailments. Pramanas and Vada margas etc. remind the student of Ayurveda to study various Darsans in order to get a comprehensive idea of the subject, Acharya Dhanwantari while teaching his students Sushruta etc. clearly instructed that “For explanation of truth and principles quoted from other branches of science or philosophy and incidentally discussed in the present work, the student is referred to the exposition made by the masters of those sciences or philosophies, since it is impossible to deal with all branches of science etc. in a single book and within so short a compass”.36 (S.S. Ch. IV). He further instructs that “by the study of a single Shastra a man can never catch the true import of this science of medicine. Therefore a physician should study as many allied branches of science or philosophy as possible”.37 Not only this he also warns the students of Ayurveda that—“the science of medicine is as incomprehensible as the ocean. It cannot be fully described even in millions and billions of verses. Dull people who are incapable of catching the real import of the science of reasoning (Tarka) would fail to acquire a proper insight into the science of medicine if dealt with elaborately in thousands of verses. The occult principles of the science of medicine, as explained in these pages would, therefore sprout and grow and bear fruit only under the congenial heat of a medical genius. A learned and experienced medical man would therefore try to understand the occult principles herein inculcated with due caution and with reference to other sciences.”38 (S. Ut. Ch. 19).

The philosophical background of Ayurveda reminds us of the necessity for a study of Indian Philosophy for a better and comprehensive understanding of the basic and fundamental principles of Ayurveda.
Historical background

Ayurveda is an ancient Indian Medical Science. It had a glorious past and it flourished well between the period from 10th Century B.C. to A.D. 10th Century. It principles were laid down by sages living in the Himalayas after prolonged meditation and discussion amongst themselves. These basic principles were further expanded and crystalised by the subsequent workers and scholars of the subject. In fact they were first to propound the humoral basis of health and disease. These humoral theories subsequently went to Egypt, Greece and European countries where pioneer physicians like Hippocrates, Galen etc. made full use of them for the propagation of their theories of medical sciences in the West. Similarly, many of the principles of Indian Medicine went to China and Japan through Tibetan authors in the early period of history. From these historical facts one can say that Ayurveda seems to be the most ancient medical science of the world. However, subsequently, as a result of repeated invasions and subjugations by Muslims in the early period and by Britishers at a later period this science could not keep up with the progress made in other countries. In fact it remained where it was about a thousand years ago. It is only recently that earnest attempts are being made to revive and re-study the ancient Indian Medical Science by using all the modern scientific parameters. It is hoped that in due course of time these sincere attempts will bear fruit and Ayurveda can once again become a living medical science for the benefit of the entire mankind.

Generally, Ayurveda takes man as a whole which includes his body, mind and spirit. This is in contrast to modern
medical science in which a man mainly includes the physical body. This wholeistic approach of man in Ayurveda makes a great difference between it and modern medical science. Thus, in the definition of a healthy person, Sushruta says "He is a healthy person who has well balanced humours and harmones, normal activities of all the organs and tissues, and a pleasant disposition of spirit, mind and sense organs".

Here humours have been given great importance by the ancient Indian authors. This is almost similar to the one propounded by Hippocrates in 5th Century B.C. excepting that he had described 4 humours instead of three mentioned in Ayurveda. In modern medicine, as the study of anatomy and physiology made progress during A.D. 16-17 Century, the earlier humoral theories were gradually replaced by the Electrical theory for transmission of massages from one part of the body to the other. However, in the beginning of this century when our biochemical knowledge had advanced greatly, again we have been presented with neurohumoral theories for all the activities of our body. Since then although an enormous amount of work has been done by various pioneers in the field, no integrated approach has been made to pool these findings and analyse them in the background of earlier humoral theories put forward by the ancient Indian authors. However, on a closer study of both these sciences, namely the humoral theories of Ayurveda, and Neurohumoral findings of modern medical sciences, one can readily understand the similarly and the relationship to each other.

A Study of the Humoral and Neuro-humoral Basis

From all the available descriptions of ancient Indian medical science one can say that Vata indicates the nervous system. As indicated in the Atharvaveda, the main seat of activity of Vata is the cerebral cortex. It is the most sensitive humor of our body responding readily to internal and environmental changes. In fact, it initiates all the psychosomatic responses to all types of stimuli reaching it through the sense organs. It performs its function by promptly liberating acetylcholine both in the cerebral cortex and also in the whole body at the nerve endings of parasympathetic nerves and the
pheripheral nerves of voluntary muscles. Thus, the activity of
the humour-Vata can be measured by estimating Acetylcholine
in that organ or part of the body. To estimate the
over all response of the Vata in the body, one will have
to estimate acetylcholine and its degrading enzyme cholinestara
races in the blood. In Ayurveda, ancient authors had described
five important divisions of this humour-Vata to denote their
role in performing some of the vital functions of the body
(Fig. 1).

TYPES OF VATA
1. Prana
2. Udana
3. Samana
4. Apana
5. Vayana

Fig. 1
Although this neurohumor is present all over the body, the specific functions have been indicated by these divisions.

1. Prana—Parasympathetic portion of pulmonary plexuses
2. Udana—Parasympathetic portion of cardiac plexuses
3. Samana—parasympathetic portion of caeliac plexuses
4. Apana—Parasympathetic portion of sacral plexuses
5. Vyana—Motor nerves of the whole body.

They all carry on their functions by liberating acetylcholine locally whenever they receive the stimulus from the main seat of Vata namely the cerebral cortex. Normally when the stimulus reaches the brain, acetylcholine is liberated in the particular part of the cerebral cortex from where the massage reaches to the appropriate organ where again acetylcholine is liberated to produce its desired action. Therefore humor-Vata can very well be equated with the neurohumor acetylcholine.

Pitta

After making a thorough study of Ayurvedic literature we have come to the conclusion that the activities of Pitta closely resemble that of sympathetic nervous system and its neurohumor catecholamine which consists of adrenaline, noradrenaline and dopamine. It is known that he adrenaline is the main neuro-humor which helps in the liberation of energy in the cell by activating through the adenyly cyclase system. By liberating energy it produces heat in the body, which is the main function of Pitta. It also regulates the circulation of blood specially at microcirculation level. Its main seat of activity is the hypothalamus where it receives the massages from the Vatic centre in the cerebral cortex. From here Pitta transmits all its massages mainly through the sympathetic nerve endings and also liberating dopamine, noradrenaline and adrenaline at their nerve endings and also in the adrenal medulla. The activity of Pitta is also divided in 5 main locations of the body (Fig. 2). They are:
TYPES OF PITTA

1. Sadhaka
2. Alochaka
3. Pachaka
4. Ranjaka
5. Bhrajaka

Fig. 2

1. Sadhaka Pitta: Catecholaminergic fibres of hypothalamus.
5. Bhrajaka Pitta: Cutaneous sympathetic nerves.

These are some of the parts of the body where these neurohumors, namely catecholamines take active part in different functions of the body. However, the initiation of
activity of the sympathetic nervous system occurs only through Vata or the cerebral cortex.

Kapha

According to Ayurveda, Kapha is also found all over the body and regulates the fluid balance in all the tissues and organs. Because of this function, we came to the conclusion that histamine is the substance which closely stimulates the activities of Kapha. Its main function is vasodilatation at the capillary level due to which fluids can freely pass from the vascular compartment to the extra-cellular space and vice versa. If there is too much of liberation of histamine, there is a marked vasodilation which leads to excessive fluid accumulation such as we seen in the inflammatory process. All these physiological and pathological processes are closely associated with the stated activity of Kapha and hence there is no doubt that Kapha can be interpreted as histamine like substances present in all the tissues and organs of the body.

Ayurveda describes 5 sub-groups of Kapha also depending upon the predominant activities in these areas (Fig. 3).

1. Kledak Kapha regulates the secretions of the stomach and also the other part of intestinal canal. It is known that histamine like substance plays a dominant role in the secretion of gastric juice and also the secretion of mucus and hence it readily fits in with this Kapha. Recently the histamine that is active in the stomach is found to have a special activity on H² receptor and hence such a classification in Ayurveda may have special meaning.

2. Avalambak Kapha is the main seat of activity in the chest, specially the lungs. It is now well established that the lung has a high content of histamine and hence it fits in with the ancient theory. This regulates the secretion of tracheobronchial tree. Histamine is also found in good quantity in the heart and hence the Avalambak Kapha can be found in this organ also.

3. Bodhak Kapha regulates the salivary and other mucus secretion in the mouth. These continuous secretions of fluid by these glands help to lubricate the food and also facilitate the perception of the taste of all the foods and drinks taken
inside. Here also histamine plays an important role in the activities of the salivary glands.

4. Tarpak Kapha regulates the fluid exchange in the brain. Recently it has been found that histamine is present in abundance in the brain especially in the region of the brain stem. Hence it fits in nicely with the present day concept of the role of histamine in the function of the brain.

TYPES OF KAPHA

1. Kiedaka
2. Avalambaka
3. Bodhaka
4. Tarpaka
5. Shleshaka

Fig. 3

5. Shleshak Kapha functions in the joints space where the synovial fluid is constantly formed and absorbed. Even here:
histamine plays an important role and hence Shleshak Kapha can be explained on this basis.

From all these findings, one can easily understand the entire process of physiological and pathological changes of the body based on these neuro-humoral changes during health and disease. That is why the ancient Indian authors had attached so much importance to the understanding of these three humours and their function. In fact, every functional or pathological change in the body can be attributed to the changes in the above stated neuro-humours.

Normally these neuro-humours or Doshas are in a state of continuous flux and they have definite circadian rhythms. Sometimes there is excessive synthesis or too much of outpouring into the blood and some other time there is comparatively less synthesis due to various reasons. Thus, during certain parts of the day or month depending upon the climatic condition, these neuro-humoral activity may change in the above manner. Similarly in childhood there is a great deal of activity of histamine; in adult life there is excessive action of catecholamine and in old age the acetylcholine activity increases. This fits in with the Ayurvedic theories that the three neuro-humours—Kapha, Pitta and Vata remain active in the young, middle and old people.

**Body Constitution**

In Ayurveda, three primary body constitutions have been described based on the predominance of their neuro-humours—Vata, Pitta and Kapha. Therefore, based on their physical appearance as described in Ayurveda, we at first divided people we experimented upon, into three groups and then estimated the above neuro-humours and their degrading enzymes, namely cholinesterases, monoamine oxidase, and histaminase. To our great satisfaction we could clearly confirm these Ayurvedic concepts of body constitution with the modern neurohumoral investigation in these people. Thus the persons who had been labelled as Vata constitution have a predominance of acetylcholine and cholinestases. Similarly people of Pitta constitution had more activity of catecholamines and their enzyme monoamine oxidase. In the way the
persons with a Kapha constitution had greater turn-over of histamine and histaminase in the body. From these findings also we are quite convinced that these humours described in Ayurveda by the ancient authors are nothing but the three neuro-humours acetylcholine, catecholamines and histamine described by modern scientists in recent years.

Pathogenesis of Diseases

According to Ayurveda all the neurohumoral content remains in a healthy person at an optimum level. Similarly their variations due to internal stress and strain of life or due to external climatic conditions also remain within the physiological limits. However, if the variations of these neurohumours are too much, pathological changes may take place which may lead to the development of diseases. Here we should remember that some people are genetically susceptible to certain diseases, whereas others become susceptible to the disease due to various environmental factors subsequent to their birth. In still others, both these factors may operate to cause the diseases. However, Ayurveda has given greater importance to hereditary factors than modern science. Ayurveda feels that, based on their body constitution, people with Vata constitution on exposure to stress are liable to produce acetylcholine and therefore they are more prone to develop diseases like peptic ulcer, thyrotoxicosis etc. Those who produce more catecholamines on receiving stress (Pitta constitution—mesomorphs) are liable to develop more of cardio-vascular diseases. The persons with a capacity to produce more of histamine (Kapha constitution—endomorphs) on exposure to stress are more liable to develop asthma, ulcerative colitis etc. These are some of the genetic susceptibilities inherited by each individual from his partents. So far, modern science has not given much importance to these factors. It is only recently that Axelrod and his group observed that certain diseases like schizophrenia may be a genetically inherited disease and for this they measured the catecholamine metabolising enzyme "mono-amine oxidase" (MAO) in the platelets. They found a good correlation showing that all the schizophrenics have a low platelet MAO with greater
susceptibility to produce more of catecholamine. We extended our studies further by measuring all the three neurohumoral metabolising enzymes namely cholinesterases, MAO, and histamines in the platelets and we found that this could be a good indication of genetic susceptibility of neuro-humoral activities of each person. In addition to this there are indications to show that one also inherits organ weaknesses from one's parents. In these cases, the neuro-humoral enzymes present in the given organ may be deficient making it more vulnerable to disease in that particular organ. From these findings one can realise the great importance that Ayurveda has given to various hereditary factors in the development of diseases.

Environmental Factors

According to Ayurveda the stress and strain of life occurs as a result of too much of stimulation of sense organs, too little stimulation or perverted stimulation. For example, if one eats too much or too little (starvation) or eats disagreeable food then one is liable to get stress disorder. Similarly, if one sees or hears too many good things or bad things for a prolonged period then also one is liable to stressful changes in the body. In the same way, if one has to work hard in an extreme cold or hot environment then also one is liable in due course of time, to develop stress disorders. Similarly, if one continuously worries over certain unhappy situations of the past or accidents and for prolonged periods, then also one is liable to develop stressful conditions. In short, any abnormal life experience that occurs as a result of excessive, defective or perverted activity self-caused or otherwise for a long time then he sooner or later becomes a victim of stress diseases.

Pathogenesis of Psychosomatic diseases

Thus, all these stressful stimuli at first reach the sensory areas of the brain. From there the messages reach the respective areas of the brain, specially the psychic centre of frontal lobe. From this region the messages reach the
hypothalamus via the limbic system of the brain so as to arouse the various emotional factors. From hypothalamus the stimulation also reach the brain strain area (reticular formation) and reach the entire body through the autonomic nervous system and also peripheral nerves. In this process the three neuro-humours play a dominant role and cause various stress diseases in due course of time depending upon the body constitution, weakness of the organ or extent of stressful situations. Ayurvedic scholars describe six stages of neuro-humoral abnormalities before the diseases produce their full-fledged clinical features in a given patient. This is a unique contribution of Ayurveda and if one understands these processes according to modern physiopathology, the physician can do a great service to his patients by diagnosing the stress diseases in the early stages and can treat them effectively in time. Similarly he can also prescribe various preventive measures to others facing similar stressful situations.

Thus, in the first stage of excessive stimuli there occurs an excessive turnover of acetylcholine or Vata in the cerebral cortex which would usually give rise to symptoms of too much of worry, sleeplessness, nervousness etc. In the second stage of Prakopa, as a result of excessive activity of acetylcholine in the cortex for a long period there occurs excessive activity of catecholamines in the hypothalamus which leads to increased activity of the sympathetic nervous system. This produces symptoms like irritability, palpitation, rapid pulse and other similar symptoms of the circulatory system. In the third stage of Prasara, there occurs an increased level of histamine both in the brain stem area and also in the peripheral tissues leading to neurohumoral disturbances in the whole body. This produces generalised functional disturbances of all the organs leading to lethargy, weakness, rise of temperature etc.

In the fourth stage which is known as Sthan Samsharya or localisation phenomenon, these neuro-humours ultimately settle down in one of the organs like the heart, lung or stomach which had remained weak partly due to genetic inheritance and partly due to various environmental factors of the person occurring after birth. In this stage all these neuro-humors accumulate in the organ.
In the fifth stage of Vyakti or manifestation stage one or two of the neuro-humours become predominantly active to produce various functional disturbances of the organ such as symptoms of hyperchlorhydria in a potential case of peptic ulcer.

In the sixth stage of Bheda or rupture, a full-fledged pathological lesion such as ulcer in the stomach or ulcers in the colon develop. It is in these late conditions that one now recognises the disease process in modern medical sciences.

From the above one can clearly understand the psychosomatic basis of all disease processes and there are always six definite psychic and somatic stages before a particular disease localises itself in an organ. Further, one should also realise that at first all the diseases involve the whole body and then ultimately settle down in one of the susceptible organs. In many of the patients the generalised symptoms may still persist after the localisation process in an organ whereas in others it may remain masked. But while giving treatment, one must keep these facts in mind and give the treatment to improve the psychosomatic constitution as a whole in addition to the treatment of the local disease process.

From this one can also realise that the modern pathological and radiological diagnosis of the diseases is done in the last stage of the disease process and hence one need not wait till this stage is reached for making the correct diagnosis. In fact the modern physician should be able to recognise the neuro-humoral disturbances in the early or functional stages of the disease and institute necessary treatment to overcome them in the initial period. Hence, neuro-humoral estimations in all these cases seem to be the most important diagnostic method for the proper management of these cases in future. It seems that in all disorders like congenital, traumatic infective of neoplastic the neuro-humours play an important role. In the traumatic cases, the injury occurs first and then various neuro-humoral changes take place till the healing of the injured tissue is completed. Whereas in all others, the neuro-humoral changes take place at first as a result of various stressful stimuli, and this is followed by the development of the disease process, at first in the whole body to be followed
by settling down of the disease in a susceptible organ. We have already conducted certain studies to establish these facts in cases of thyrotoxicosis and we feel all the other psychosomatic disease processes also develop in the same manner. However this needs further confirmation.

Principles of Treatment

Preventive measures: In Ayurveda, many measures describe how to preserve good health throughout the years of one's life. They discuss extensively the daily routines of individuals (Dinacharya) with regard to cleanliness, diet, exercise and all other matters. Similarly they also give detailed suggestions for preserving one's health in different seasons of the year (Ritucharya). In addition, they prescribe certain specific rejuvenating measures for prevention of aging and to remain active and energetic for a prolonged period of time.

Yoga

Amongst other measures, we had an opportunity to study the use of Yoga for maintaining a healthy state. Although the sage Patanjali had described eight methods of yogic practice for developing positive health by a common man, only three methods are essential. These are postural exercises, breath holding and meditation. Such practices can be done either in the morning or evening lasting for about 30 minutes. We studied the effect of these yogic practices on the neuro-humours, hormones and the metabolism of healthy individuals. We found that these practices of Yoga normalise the neuro-humours if they are found in excess or deficient. Similarly one could also observe much improvement in the endocrinal and metabolic functions in these people practising yoga. All these changes indicate that the persons practising Yoga can face various stressful situations, much better and more efficiently and without the development of much harmful effects in the body.

In the treatment proper also, we have used various yogic practices in the treatment of stress disorders like hypertension, diabetes mellitus, asthma etc. To our great satisfaction, the
regular practice of yoga greatly helped these patients to overcome these diseases in the early stage. We observed that they produce their beneficial effects by bringing down of the excess of neuro-humoral circulation in the body. Even in advanced cases, Yoga can be used as a therapeutic measure along with the well established medical measures so as to reduce the duration of treatment.

Medical Measures

The main principle of treatment in Ayurveda is to give medical measures which would correct the disturbed neuro-humors in the body. This is done by giving herbal remedies, specific dietetic regime, and also by other ancillary measures. In the beginning, medicines are given to reduce the neuro-humors by vomiting, purgation, or medicated enema. If the above procedure is not possible various drugs are given to normalise the humours at the site of the pathological process going on in a particular organ. This can be supplemented wherever feasible by the external application of drugs. Both kinds of treatment are given with a clear understanding that the main principle of treatment is to bring back the neuro-humoral level to normalcy.

In those cases, where medical measures taken internally or applied externally do not produce the desired results in a reasonable time, one should resort to surgical treatment. Sushruta emphasises this point and discusses the pre-operative, operative and post-operative measures in detail to overcome such a disease process.

Further, it appears that the ancient sages had tested all the medicinal herbs clinically so as to assess their action in the body. Although they had described the action of these herbs in great detail in all respects, in modern times there can be some simple methods to find out the role of these herbs on the neuro-humours. Thus, one can study whether a given herb increases or decreases the neuro-humour by measuring the basic component of the neuro-humours in each herb—such as choline content for acetylcholine, tyrosine concet for catecholamines and histadine content for histamine. These could be a simple screening test whereafter, a detailed pharmacolo-
gical studies can be carried out to assess their values in respect of each neuro-humour. These are some of the research methods proposed to be adopted for studying the efficacy of various herbs in the treatment of different disease processes.

In this way, we have only made a beginning for research in Ayurveda by using all the modern scientific methods. It is hoped that by following these methods, we will unravel all the hidden treasures of Ayurveda for the benefit of humanity as a whole.

REFERENCES

Ayurveda means science of life and is strictly speaking native to the sub-continent. Its beginnings, as those of any other science which deals with man, lie deep in unrecorded history but the traditionally accepted view dates it to about 5,000 years ago. A study of the early literature of Ayurveda shows the heights it had reached and the extent of medical knowledge of the ancient Aryans who fathered this great science. About the beginning of the Christian era, Ayurveda had reached its zenith and had spread far and wide, influencing deeply the systems of medicine prevalent in the various countries of the world and China. Till 11th century Ayurveda continued to receive patronage at the hands of various rulers, but gradually the study and growth declined due to political and sociological changes that occurred with the change of dynasties in India. With the advent of Britishers on the Indian horizon, the Western (Allopathic) Medicine was introduced by the British in the third decade of the 19th century and the native systems were relegated to the background. Whatever be the cause of its decline, the science and practice of Ayurveda did not extinguish itself completely, but continued to have patrons both in the rural and urban areas, more so in rural areas, where the Western medicine could not make appreciable inroads. Ayurveda as a system of medicine still continues to claim a major share in the medical relief of the people due to its popularity, and is estimated to look after the medical needs of more than 80% of the people of the country. Ayurveda is very popular among the rural population as the treatment through Ayurveda is effective and cheap and therefore suited to the economic conditions of the people.
In 1827, the first ever step was taken to offer systematic education in Ayurveda by opening a Government College at Calcutta. However, the East India Company, the predecessor to the British Crown, decided in 1833 to stop these classes and set up the Calcutta Medical College for imparting training in Western Medicine. The nationalist elements in the country supported by the enlightened intelligentsia offered a challenge to Western thought, learning and mode of life. This reaction subsequently led to the rehabilitation of Ayurveda through the establishment of an All India Ayurveda Mahamandal in the early years of the present century.

The Indian National Congress at its Nagpur Session in 1920 opined that, having regard to the widely prevalent and generally accepted utility of the Ayurveda system of medicine in the country, earnest and definite efforts should be made by the people of this country to further popularise schools, colleges and hospitals for instruction and treatment in accordance with the Ayurvedic system. A number of provincial Governments (now States) also took an interest in the revival of Ayurveda and other systems of Indian medicine and set up Committees to advise them on the measures to be taken for the revival and the development of Ayurveda and other systems of indigenous medicine for the benefit of the vast population of the country. These Committees made useful recommendations from time to time, and the State Governments did their best to implement these recommendations as would fit in with their then existing policies of medical relief.

It was not until 1946 that a decision at the level of the Government of India was taken to explore ways and means for the planned development and utilisation of the Ayurvedic system of medicine. The Central Government set up a Committee popularly known as the Chopra Committee of medical scientists including Vaidyas and Hakims. This Committee studied the problems at length and made far reaching recommendations in matters relating to the training programme, need for research in Ayurveda, organisation of medical relief and utilising the services of its practitioners. The major recommendation made by this Committee related to integration of Ayurveda and Western medicine, leading to a synthesis of medicines into one system at the national level.
Even though India attained independence in 1947, the administrative framework left behind by the Britishers could not overnight agree to make far reaching and sweeping changes, specially where the health care needs of the people were concerned. The Government policy makers were of the view at that time that research into the Ayurvedic system of medicine should be framed on a broad basis so that, those results of such research as are of proven value will not only enrich the Ayurvedic system but will also be integrated in modern Allopathic medicine.

The Government of India subsequently appointed a number of committees on this subject. Most note worthy of them was the Shuddha Ayurvedic Education Committee appointed in 1963 to study *de novo* problems relating to Ayurveda.

**Education and Training**

In regard to education and training in Ayurveda, there had been three schools of thought on the methods to be adopted to impart training in Ayurveda. One school felt that Ayurveda was all-embracing and there was nothing that had not been covered in the classical literature. Another school of thought felt that Ayurveda had remained static for a number of centuries and had not kept abreast of more recent developments in the field of medicine in different parts of the globe. This led to the belief that teaching in Ayurveda should be supplemented by recent advances in medical sciences and the gaps should be filled. What started as a genuine desire to supplement the theories and practice of Ayurveda, resulted actually in their being substituted to the detriment of a proper understanding of the science of Ayurveda.

The Chopra Committee envisaged a three stage training leading to synthesis or evolution of a unified system of medicine: 1. Firstly, by bilateral integrated study, that is, by the arrangement of the curriculum in such a way that whatever is wanting in one system is supplemented and strengthened by the strong points of the other; 2. Next, by unified tuition by a common teacher who will give reconciliatory views of the Ayurvedic and Western systems;
3. Finally, by research work in testing and checking the hypothesis and theories with a view to reconciling or rejecting them, ultimately leading to a complete integration and final synthesis of both.

Even though the Government of India had concluded that integration of Ayurveda and Western Medicine on the basis contemplated by the Chopra Committee was impracticable, as the theories and principles of modern medicine were entirely different from those enunciated by Ayurveda, the State Governments proceeded with experimentation towards the integration of the systems. This however only took the form of concurrent training in subjects of Ayurveda and Western medicine by different sets of teachers in watertight compartments, without any attempt at trying to understand and appreciate the salient features of one or the other. It must be admitted that both the systems could not be taught within the prescribed period of five years.

In spite of the efforts made by the Central and the State Governments to ensure the revival of the Ayurvedic system of medicine to its pristine glory, nothing concrete could be done, due to divergent views of the experts and policymakers. All committees appointed by the Central and State Governments therefore unanimously recommended the constitution of a Statutory Central Council to regulate education in and practice of Ayurveda. Pandit Shiv Sharma entered the Parliament as an elected Member of the Lok Sabha with the object of exerting his influence towards the setting up of the Central Council for Ayurveda by an Act of Parliament. Largely due to his personal endeavours a statutory Central Council of Indian Medicine was constituted in December, 1970 by a Parliamentary Act. This Council has now framed regulations for minimum standards of education in Ayurveda, which are adopted in all the Ayurvedic colleges in the country. Thus, a beginning has been made for uniformity in training which will ensure the availability of well trained practitioners of this system to cope with the medical relief and health care needs of the people. At present there are 88 colleges, all of them affiliated to Universities to ensure a high standard of academic control as compared to about 40 colleges of Ayurveda that existed in 1947. The number of
students passing out of these colleges has increased from just about 1,00 in 1947 to 5,000 in 1977.

No regulations for ensuring minimum standards of education can succeed unless teachers of the requisite calibre and talent are available to impart training to the students in the colleges. Similarly, the need for research, on the results of which educational training could further be improved, is also vital. In order to ensure availability of well trained and competent teachers and research workers, the Government of India set up the Post-Graduate Training Centre in Ayurveda at Jamnagar in the year 1955 (this centre has since been merged with Gujarat Ayurved University). The Post-Graduate Institute in Indian Medicine (Ayurveda) was also established at the Banaras Hindu University, Varanasi in 1963. During the last five years, facilities for post-graduate education have been given further fillip by the establishment of 15 postgraduate departments in selected Ayurvedic colleges. Complete financial assistance is being given by the Government of India to such post-graduate Institutes and Departments. In order to provide for demonstrable minimum standards of education laid down by the Central Council of Indian Medicine, the Government of India have also set up the National Institute for Ayurveda as a model Institute for Ayurvedic education and research in the country.

Ayurveda and other indigenous systems of medicine in the country are destined to secure their rightful place and their old glory at the hands of present Government at the Centre. Farsighted policies adopted in right earnest are aimed at bringing simple medical aid within the reach of every citizen, by organising a cadre of medical, paramedical and community health workers, among whom trained practitioners of Ayurveda and other systems of indigenous Medicine will form a major part. Keeping in view this objective, the Government proposes to make all out efforts by providing encouragement and support to State Governments for the development of existing Ayurvedic colleges so as to raise them to the standards laid down by CCIM.

Medical Care

The present Government is committed to making special
efforts for providing medical facilities in rural areas and to-weaker sections of the society including urban areas, to ensure that the basic medical facilities would be within their reach in a short time. As already stated the Government of India is determined to utilise Ayurveda and other systems of Indian Medicine in the implementation of this programme. The Primary Health Centres presently consist only of doctors of Modern Medicine and in many cases these centres are not fully staffed, since the doctors of modern medicine find it difficult to settle down in rural areas, where facilities of the type in which they were trained are not available. Moreover, the bulk of the people covered by the network of the Primary Health Centres rely on the Ayurvedic system of medicine. The Government of India has therefore recommended to the States to open a wing for Ayurveda (or other systems of Indian Medicine according to local demands) in the Primary Health Centres. It has also been recommended that one of the sub-centres of the Primary Health Centres should be converted into a sub-centre, catering entirely through Ayurvedic or other system of Medicine according to the actual response of the people of these areas.

The Government of India launched a Rural Health Scheme in October, 1977. Under this Scheme medical kits consisting of medicines of Indigenous Systems are to be given to health workers. They would be given adequate training in the diagnosis of common ailments which constitute the bulk of ailments of the rural people and also training in personal hygiene and community health, with a view to giving emphasis to preventive aspects of diseases.

India is a vast country; the density of population varies from a maximum of 1000 per sq. km. to just a few per sq. km. Communication facilities also do not exist in remote inaccessible mountain areas, in tribal areas and in desert areas. The medical care to the inhabitants of such areas therefore, depends mainly on the available local herbal remedies. Launching of programmes to utilise the Ayurvedic system of medicine in the medical care programme at the level of such areas needs the provision of referral hospitals and thus assumes importance. For this purpose, the State Governments have been urged to establish hospitals with adequate-
bed strength at the semi-urban and urban headquarters. A beginning in this direction has already been made by some State Governments, notably in Gujarat, Rajasthan, Uttar Pradesh and Kerala. Adequate finances are proposed to be made in the Plan allocation of States for these purposes. To cater to the needs of medical relief through Ayurveda the number of registered practitioners which was 40,000 in 1947 has risen to 1,56,000 now. Presently, there are 215 hospitals and 12,000 dispensaries as compared to 40 hospitals and 3,000 dispensaries in 1947. The Central Government Health Scheme provides for 14 Ayurvedic dispensaries. Proposals are under consideration to add to each CGHS dispensary an Ayurvedic wing and also to establish hospitals. In Delhi itself, a beginning has been made to open a 300 bed hospital where treatment will be exclusively through Ayurveda.

Pharmacy

No scheme of medical relief will be fruitful in the absence of availability of genuine drugs and medicaments. There are at present over 3,000 pharmacies engaged in the manufacture of drugs of Ayurveda in the country. The value of these drugs presently manufactured by the Pharmaceutical Industry of Ayurveda can roughly be estimated at 70 crore rupees. Export of Ayurvedic drugs is confined not only to South East and Middle East countries but, also to Europ and America. Unlike drugs of Western medicine which rely wholly or partly on synthetic chemicals, Ayurvedic medicines rely on drugs which are of plant, mineral and animal origin.

The Ayurvedic Pharmacoeopia Committee in the Ministry of Health and Family Welfare have therefore, given priority to the compilation of a National Formulary of 450 compound formulations which are manufactured and sold on a large scale by the Ayurvedic Pharmaceutical Industry and are also used by practitioners of this system. Efforts have successfully been made to establish the botanical identity of the plant drugs. Control over the manufacture and sale of Ayurvedic medicines is also exercised through the Drugs and Cosmetics Act.

A number of State Governments have set up Pharmacies
in the Public Sector for the manufacture of Ayurvedic Medicines to meet the requirements of the medical relief Institutions of Ayurveda maintained by them. To make available potent drugs of Ayurveda and other systems of medicine, a Central Pharmacy is to be established by the Central Government. In addition, the Central Government provides financial assistance to the Pharmacies maintained by the State Governments in order to increase the production capacity of genuine drugs, to meet the requirements not only of their medical relief institutions but also of the public at large.

Ayurvedic medicines are mostly manufactured according to the formulae and processes mentioned in the classical texts. With the advances in science and technology, a continuous search is on for new drugs to combat unknown and new diseases, and the action of a drug on conditions other than those known or described in the texts. Thus, a large number of patent drugs have come up in the country. These time tested Ayurvedic drugs have proved popular not only because of their easy availability but are preferred for the treatment of iatrogenic diseases.

Research

As has already been mentioned earlier, all the Committees appointed by the Government of India and State Governments have recognised the need for research in every aspect of Ayurveda, so that training in and practice of these systems can keep abreast with current advances. As early as 1951, the Government of India rendered financial assistance for clinical research in selected institutions of Ayurveda maintained by the State Governments and voluntary organisations. In 1960 the Central Council of Ayurvedic Research was established to advise the Government of India on the measures to be taken for promoting research. This Council functioned only in an advisory capacity in the Ministry of Health. A review of the progress made in the field of research from 1951 to 1967 was conducted in the year 1968, when it was found that although research activities were going ahead, these were neither on the right lines, namely on the principles.
of Ayurveda, nor were they speedy enough. Our present Prime Minister, Shri Morarji R. Desai, who was then the Deputy Prime Minister took the initiative to establish an autonomous Central Council of Ayurvedic Research, consisting of eminent practitioners and educationists in the Ayurvedic system of medicine, so that the lines of research could fit in with the principles and methodology of Ayurveda. Thus, the autonomous Central Council for Research in Indian Medicine and Homoeopathy (Ayurveda, Siddha, Unani, Homoeopathy and Yoga) came into being in the year 1969. The Council is engaged in research programmes in different fields, giving priority to those areas which have a potentiality for greater utilitarian value in the context of the health and medical care needs of the country.

The areas of research were broadly identified as below:

1. Clinical research oriented not only to find a drug for successful treatment, but to establish the pathogenesis of diseases.
2. Research in drugs used in Indian medicine and Homoeopathy and folk practice at multi disciplinary level.
3. Medico-botanical survey of the entire country to assess the availability of medicinal resources.
4. Collection of folk information and recipes not described in classical works.
5. Evolving of standards for drugs and pharmaceutical preparations used in Indian Medicine.
6. Research into fundamental doctrines on which the medical system is based.
7. Medico historical research concerned with the Indian Systems and their influence on their contemporary Systems and society.

To achieve the above objectives two Central Research Institutes, 4 Regional Research Institutes, 5 Regional Research Centres, 2 other Research Institutes and 80 Units/Enquiries have been established throughout the country. Information has also been collected about the prevalence of folk-lore claims. As many as 9 patents have been taken for new processes
likely to have potential use in tackling diseases which have resisted presently available drugs. A number of publications have been brought out by the Council on the studies conducted. Periodical seminars for research workers are also arranged. The financial outlay for research which was a mere Rs. 34,000 in 1951 has now risen to Rs. 15 crores today.

Administrative set-up and Status

Almost all State Governments have an organisational/administrative set-up, independent of the set-up for modern allopathic medicine, for the execution of programmes relating to Ayurveda and other Indigenous Systems. The Central Government has also had an independent set-up since 1958.

The Central Government is wedded to the policy of equal status for the practitioners of Ayurveda. Under the Indian Medicine Central Council Act, 1970, a practitioner of Ayurveda has the same status as conferred on his counterpart in modern medicine. Equal remuneration for those who render medical relief through Ayurveda and other systems of Indigenous Medicine has also been proposed.

India’s influence at International Agencies

The revival and onward march of Indigenous Systems of Medicine within the country has been followed recently by the notable leap forward to the International scene. The intrinsic merits of these systems cannot remain confined to the country of its origin and sooner or later, these are bound to play an important role in alleviating the sufferings of the peoples of the world. It was therefore a welcome augury to note that the World Health Organisation under the able stewardship of Dr. V.T.H. Gunaratne, realised the importance; popularity and utility of the traditional systems of medicine in South East Asian countries in the field of medical care programme and, advocated the need for the development of well recognised traditional systems of medicine and, organised series of seminars so as to enable Member States to exchange information and, urged the interested Governments of the region to give adequate importance to develop
the traditional systems of medicine, not merely as an alternative to the modern system of medicine but in close conjunction with it, so as to take advantage of the best from both.

One may make bold to say that the Government of India today attaches the utmost importance to the fuller utilisation of Ayurvedic system of medicine in the overall medical care programme of the country. The present efforts to regulate standards of training and the practice of Ayurveda in the country, utilisation of the practitioners of Ayurveda at all levels of the medical care programmes, and increased financial outlay being earmarked for Ayurveda thus makes one confident that the status of Ayurveda today occupies an important place in the policy of the Government of India.